ELEMENTS

OF

MATERIA MEDICA

AND

THERAPEUTICS.

BY

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WITH ADDITIONS AND ALTERATIONS,

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PREFACE.

In introducing another work upon Materia Medica, in addition to those already before the public, the writers desire that it should be looked upon as strictly elementary; and, in so far as the description of the drugs is concerned, nothing more than a compilation. The necessity for this outline has been pressed upon them for some time by students with whom they are respectively connected, as well as by gentlemen in considerable practice, both of whom felt the inconvenience of reading through extended treatises, with a view to those essential points of instruction which might be conveyed in fewer words and be less encumbered with extrinsic matter. Without depreciating, then, the larger works in our language as books of reference, the present is intended to be one every word of which the student ought to read, and with whose entire contents he should render himself familiar.

Besides endeavouring to curtail the subject, it has been a primary object to facilitate its study by arrangement; accordingly, every article has been treated of, as far as practicable, under the same heads and in a similar manner. The general principles of Therapeutics, with those of Chemistry and Natural History, in their application to Materia Medica, have been included in separate introductions, in order to avoid repetition and to exhibit a connected view of each. It will also be observed, that those articles only which are rendered officinal by the London College are admitted into the body of the work; all others, which have been regarded as deserving a place in the Materia Medica, having been thrown into an appendix, together with those therapeutical means to which a distinct place could not be assigned on the plan adopted.

The authors beg to assure gentlemen advanced in their studies, or already engaged in the active duties of their profession, that it is far from their wish dogmatically to decide upon doubtful questions of therapeutics; since here, as well as upon the action of medicines (at all times delicate ground), they have merely advanced the opinions which they have adopted themselves, leaving it to the professional reader to deal with them as his judgment will suggest. They would willingly have avoided entering upon the latter of these points at all, feeling, as they do, that, even now, chemical science is only just beginning to indicate the road which must be travelled for its solution: but, at the same time, they were in an equal degree convinced that some standard, however imperfect, must be raised, around which the student may collect individual facts.

As respects the sources of their information, but little need be said. For the description of the British drugs, the large works of Drs. Thomson, Pereira, and Christison have been carefully collated and very freely used, and the established authors on Chemistry, Natural History, and Medicine, have been consulted in matters connected with these departments; while, at the same time, the writers have not neglected the resources which their own experience has afforded them.

In dividing the labour of preparation, each has assumed the portion most agreeable to his usual train of thought and reading. As regards the body of the work, the greater part of the Inorganic Division has fallen to the share of Dr. Garrod, who has also written all that is included under the head of Chemical Composition and Relations in the Organic Department. The whole of the Natural History and the Organic Materia Medica, with the above exception, have been undertaken by Dr. Ballard; while it has been endeavoured to avoid error, by each submitting his own portion to the suggestions of the other. The several introductions bear the names of their authors. In the last place, the writers feel happy in having an opportunity of expressing their acknowledgments to Dr. Sharpey and Professor Quain, for the very kind manner in

which they have forwarded their project, and for the very friendly spirit in which, not on this occasion only, but on many others, they have favoured them with their valuable counsel. It has been their wish, in the plan they have pursued, to imitate their admirable method of imparting instruction; and if any of the opinions expressed may vary from those which they learned from them in the lecture-room, they feel convinced that it will be attributed only to that free exercise of judgment which, even in opposition to their own doctrines, they have ever been the first to promote amongst their pupils.

2, King Edward Terrace,
Liverpool Road, Islington,
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PREFACE

TO THE AMERICAN EDITION.

The want of a compendious treatise on the Materia Medica, to serve as a text-book to students, has long been felt; and it has been with a view of endeavouring to supply this deficiency, that the present work by Drs. Ballard and Garrod is now offered to the profession. The great advantages it possesses, are, that it contains a larger mass of information condensed in a smaller compass, than any work of the kind that has appeared in the English language, and at the same time it is exceedingly clear and perspicuous; to use the words of the authors, it is "one, every word of which the student ought to read, and with whose entire contents he should render himself familiar."

To adapt it more fully to the use of American students, the processes and preparations directed in the United States Pharmacopœia have been added to those of the London College, to which latter alone the authors had confined themselves; these additions are marked [U. S.] A number of medicinal substances of native origin have been inserted in their appropriate places, and the descriptions of most of the others greatly extended or modified; whilst many of the articles originally included in the Appendix have been inserted in the body of the work. All additions or alterations of the text are designated by being included in brackets.

R. E. G.

Philadelphia, March 1st, 1846.

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ELEMENTS OF MATERIA MEDICA.

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GENERAL REMARKS.

Although, in a systematic work upon the Materia Medica, a Natural History arrangement of drugs has many advantages which commend it to our adoption, it is nevertheless not the first to present itself to the mind of the practical physician. He regards the articles placed in his hands as agents which he is to employ for the combating of disease; and the first question he naturally puts with respect to them, bears upon this important relation.

The two leading points which attract attention, when we review the action of medicines upon the animal economy, are the great differences which exist in their *general activity* on the one hand, and in the *kind of operation* they exert on the other. Some may be administered to a large amount with but a trifling effect upon the body, while others act as energetic poisons in very minute doses; and it is the latter class which undoubtedly furnishes remedies of the greatest value. As to the nature of their operation, equal diversity prevails. One acts upon the intestinal canal as a purgative, causing it to expel its contents *per anum;* another occasions the evacuation of the contents of the stomach by the mouth; a third produces sleep and alleviates pain; while

a fourth gives rise to spasmodic action of the muscular system. Some increase the secretions generally, others that of the skin, liver, or kidneys, separately; some elevate the tonic state of the system, while others depress it; some augment the general activity of the circulation and vital functions, while others diminish the frequency and force of the heart's pulsations and occasion syncope.

It is on this manifest diversity that the *classification* of medicines at present in use has been grounded; those having been grouped together which agree in their obvious operation. Medicines which augment the intestinal evacuations, have been included together under Cathartics or Purgatives; those which increase the general energy of the vital phenomena, under Stimulants; others which lower it, under Sedatives.

But although this arrangement is convenient, it is not strictly correct. It constantly happens that the same medicine, on the view of its remedial value, gains a place in two or several groups, while in every case its *modus operandi* is exactly the same, the special being but a part of its general operation. To take an example: *Ammonia*, internally administered, acts as a general excitant; and, as such, is very commonly prescribed; but not only does it stand in the class of stimulants side by side with *alcohol* and volatile oils, but it is also placed in the class of Diaphoretics with *Tartar emetic*, *Ipecacuan* and *Opium*. These substances, however, differ widely from ammonia in the method of their action on the economy. It remains for future research into their actual *modus operandi*, to found upon true physiological principles, a more accurate arrangement of remedial agents. This, however, is a task every where beset with difficulties; and though modern chemistry is leading the way to its accomplishment, by strict analyses both of the substances employed and of the parts they influence, yet its progress must necessarily be slow.

So far as it has already been prosecuted, however, the inquiry has not proved altogether fruitless; certain general principles having been ascertained, which we shall endeavour briefly to enumerate.

1. The first, having respect to drugs derived from the organic

kingdom, is, that none of them act upon the system by virtue of every *principle* which enters into their constitution. The great mass of vegetable drugs is composed of substances either entirely or almost inert, such as woody fibre, starch, sugar, and gum; and although the demulcent property of such of them as are yielded up to water, may render them valuable adjuncts in the treatment of disease, yet, where they are present alone, we find no energetic influence exerted upon the system at large. All the most powerful, therefore, have been found to contain some other principle on which their efficacy depends, satisfactorily proved by its giving rise to similar phenomena with those of the compound drug, while the residue of its preparation ceases any longer to produce them. We may mention, by way of example, Quina and Cinchonia existing in *Peruvian Bark*, Emetina in *Ipecacuanha*, Strychnia and Brucia in *Nux Vomica*, Morphia in *Opium*, Cathartin in *Senna*, Tannic acid in the vegetable astringents, and volatile oil or an acrid fixed oil or resin in the vegetable stimulants. It is to be observed, that many of the active principles possess the chemical reaction of an alkali, as in the first four instances adduced. Pharmacy has at various times employed solvents, with the view of withdrawing them from their accompanying useless material, and exhibiting them in a more convenient form. The Galenical preparations, as Infusions, Tinctures, Extracts, etc., have this as their chief object, but of late years, the chemist has placed in our hands the principles themselves, either in a state of purity, or in such combination as is calculated to increase the rapidity of their action. Morphia and its Hydro-chlorate and Acetate, Strychnia, Di-sulphate of Quina, Veratria, and Aconitina are at present admitted into the Pharmacopœia of the London College; and it is to be expected that further additions to the stock will in due time be made.

2. When we pass on to consider the *chemical composition of these active principles*, we obtain the singular result, that in several of those whose operation upon the nervous system is manifested in the most energetic manner, a certain similarity prevails, which arrives in some instances very closely upon identity. We allude, not so much to the relative proportion of their Carbon, Hydrogen, and Oxygen, as to their possessing a

minute proportion of Nitrogen; as indicated in the formulæ of the following alkaloids:—

Solania	$C^{84}H^{68}N\ O^{28}$	Strychnia	$C^{44}H^{23}N^{2}O^{4}$
Morphia	$C^{35}H^{20}N\ O^{6}$	Brucia	$C^{44}H^{25}N^{2}O^{7}$
Codeia	$C^{35}H^{20}N\ O^{5}$	Quina	$C^{20}H^{12}N\ O^{2}$
		Cinchonia	$C^{20}H^{12}N\ O$

Picrotoxia, moreover, the active principle of *Cocculus Indicus*, which used to be supposed entirely free from this element, has also been of late shown by Francis to contain it, though its exact quantity is not yet ascertained. To the importance of this in a theoretical point of view we must again revert; merely indicating it here as one ground on which we may predicate the activity of a vegetable drug, when analysis displays a component with so remarkable a character as this.

3. Again, the activity and kind of operation of most vegetable drugs, may be predicated from the *structure and botanical connexions* of the plants from which they are obtained. Plants are grouped together from certain affinities in structure, and experience has established the general law, that, where a group is a very natural one, the medicinal qualities of every member of it are very analogous. This appears to be grounded upon the fact of each containing active principles, either closely similar, or even identical in chemical composition and effects. The orders of Solanaceæ, Papaveraceæ, and Cruciferæ illustrate this in the most satisfactory manner; the two former being narcotic and acting with varied energy upon the cerebro-spinal functions, the latter containing plants constantly pungent and edible, either employed as articles of diet, or in ordinary use, as condiments.

4. *Inorganic* remedies, which exert a *powerful chemical influence* upon organic matter generally, produce a similar effect upon the human living body. The only operation of vitality in modifying their action, is that of imparting a power of resistance, effectual so long as the chemical forces are not excessively strong; but should these be very powerful, it is compelled to give way, and chemical changes ensue. This is the case when the concentrated acids and alkalies, or the caustic metallic salts come in contact with the tissues of the body.

5. We have before observed with regard to vegetable drugs,

the energetic action of certain principles containing *Nitrogen* in their composion. Now it is remarkable, that other *elementary substances allied to it* in their chemical characters, also possess extraordinary powers over the functions connected with the nervous system. This singular law which modern chemistry has so fully developed, that one elementary substance in an organic compound may be replaced by another agreeing with it in chemical relations, may perhaps be applied in its explanation. The substances to which we allude are *Arsenic*, *Antimony*, and *Phosphorus;* the first increases tone in muscular fibre, relieves various nervous affections of a convulsive or painful nature, and cures ague, corresponding in all these respects to *Quina:* the second lessens tone, and diminishes the force of the heart's action, produces feelings of faintness and induces vomiting, like *Tobacco; Phosphorus* operates as a powerful stimulant upon some of the functions of the encephalon. All act primarily on the nervous system; and the variety in their operation is no greater than what is observed in the organic principles alluded to. We might perhaps be induced, notwithstanding, to look upon this correspondence with some suspicion, were it not a group of elements standing by no means alone in this particular. We are not, indeed, prepared to announce it as a law established in its most extended bearings; the chemical relations of elementary bodies are not yet sufficiently understood for such an application of them to be made. All we would at this time do, is to refer to the similarity, as well in operation as in chemical relations, of similar compounds of *Iron*, *Zinc*, and *Copper*, and of *Iodine* and *Bromine;* and, if we avoid asserting the same principle to hold good with respect to the natural groups of elementary bodies, which is generally received in regard to the natural orders of plants, it is not because no probable ground can be advanced upon which to maintain our opinion.

6. The *modus operandi* of medicinal agents may be discussed under three principal divisions. Some act distinctly in a mechanical manner, and some, as evidently operate by the chemical influence which they have the power to exert. The action of fomentations and poultices, presents an illustration of the first of these modes of operation; that of strong acids, alkalies, and caustic salts, examples of the second:—a third class differs from

either of these in a very important point; for, while the action of the former is scarcely at all affected by the presence of the vital principle, these both take an active share in the transformations it brings about, and modify their ultimate result. They directly increase or diminish the energy of the vital functions, as displayed in the phenomena of sensation or motion, or else alter in some material point the formation and composition of the secretions eliminated from the blood. These two kinds of effect call for a brief separate consideration:—1st, The perception of a sensory impression and the origination of a motor influence, depend upon the mode in which the cerebro-spinal centres perform their allotted functions, and are accompanied by a transformation of their tissue. Medicines which influence either of these, therefore, might be supposed to act primarily upon the nervous system, and to modify in some way the chemical metamorphoses which it undergoes. The active principles of *Opium*, *Nux Vomica*, *Cinchona Bark*, and *Ipecacuan*, for example, might be "supposed to take a share in the formation of new, or the transformation of old brain and nervous matter." When, therefore, we inquire how far these active principles, which diminish sensibility, produce tetanic spasm, increase muscular tone, or diminish tone and induce vomiting, are fitted by their composition to act in the manner indicated, the singular result announced by Professor Liebig is obtained, "that the composition of the most active remedies, namely, the vegetable alkaloids, cannot be shown to be related to that of any constituent of the body, except only the substance of the nerves and brain." They all contain a minute amount of nitrogen, very much less than is discovered in the compounds of *Proteine*, approaching, in this respect, the fats which contain none. "If it must be admitted as an undeniable truth," argues this distinguished authority, "that the substance of the brain and nerves is produced from the elements of vegetable albumen, fibrin or caseine, either alone, or with the aid of the elements of non-azotized food, or of the fat formed from the latter; there is nothing absurd in the opinion, that other constituents of vegetables, intermediate in composition between the fats and the compounds of proteine, may be applied in the organism to the same purpose."—(*Animal Chemistry*.)

2d. In considering the mode in which remedies of this class alter the quantity of a secretion, or modify its chemical composition, two principal circumstances must be kept in view. It must be recollected, that the secreting organs are merely the agents by which the material is separated from the blood; and the amount of the secretion will depend on the circulation through them, and the healthy state of their nervous supply. The separated matters themselves, however, do not originate here: they are derived from the transformations of tissues which are constantly proceeding, with greater or less rapidity, in the body at large. Medicines, therefore, which affect secretion, must do so in one of two ways; either they must act upon the nervous centres, increasing or diminishing their influence upon the organs, and modifying the circulation through them, or, in the words of the chemist before quoted, "they must take a direct share in the change of matter in the body," or "exert an influence on the formation, or on the quality of a secretion by the addition of their elements."—(*Liebig*, *op. cit.*)

STIMULANTS.

Stimulants, when taken internally, produce an exaltation of one or more of the vital functions. The medicines included under the term may, therefore, be naturally supposed to vary much in the manner of their operation, as well as in the systems which they severally affect. And such is really the case: the class is a very wide one, and comprehends remedies of almost every kind of specific operation. The reason of this, if carefully sought, will be found in the very flimsy foundation on which the therapeutical classification of drugs has been made to rest. There is but little doubt, that as all kinds of disordered conditions in the human frame are resolvable into excess or defect of some essential element of health, so every thing capable of restoring the balance of the system will, in time, come to be distributed under two great divisions; namely, those which increase defective action on the one hand, and diminish excessive action on the other. However, till our acquaintance with the physiological relation of the several animal functions is much more perfect than at present, we fear we must content ourselves with

an incomplete arrangement, at the same time confessing our inability to confine individual medicines to their own distinct departments.

The earliest effect of the internal administration of a stimulant is manifested upon the digestive system itself; its first operation appearing to be topically exerted upon the nerves and vessels of the parts with which it comes into immediate contact. A sensation of warmth or heat is thus commonly perceived in the mouth and throat, extending to the epigastrium, and not unfrequently accompanied by the expulsion of flatus by the mouth. The progress of digestion is accelerated, and the activity of the intestines sometimes increased. Thirst is a frequent consequence, accompanied or not with a dry or reddened tongue. Sooner or later, the circulation is affected, the pulse becomes more rapid, the animal temperature raised, the face may become flushed, and a sense of general warmth diffuses itself through the frame. Where the heart is palpitating with frequent but inefficient pulsations, its action may assume greater regularity, and be rendered more effectual in the uniform distribution of the blood. Connected with this, we may notice the operation of stimulants on the organs of secretion, especially the skin and kidneys. Many of the remedies classed under the head of diaphoretics or diuretics, are actually stimulant, not to these organs only, but also to others of similar office, and indeed to the system at large. *Ammonia* from among diaphoretics, and *Cantharides* or *Juniper* from among the diuretics, may be justly selected in illustration of this truth. The excitant action of stimulants upon the nervous system is most clearly seen, in the case of those phenomena which we are most accustomed to view as connected with its functional activity. The mind for the most part becomes exhilarated, its energies, if flagging, revived, the spirits elevated, and the temper more cheerful, these symptoms being often commensurate with the alteration in the force and frequency of the pulse.

The *diffusible* stimulants, as they are termed, are those which chiefly manifest this extended operation; but there are others whose action is more or less entirely confined to special systems; and these may, by way of distinction, be designated as *specific* stimulants. The *turpentines*, *gum resins*, and *balsams*, for example, though increasing the general temperature of the body, as

well as the force and velocity of the pulse, exert a specific operation upon the mucous membranes, especially those of the lungs and urinary canals; and it is this which constitutes their chief therapeutical value. Their remedial effects have been said to depend on a new action being set up in the mucous surface, incompatible with the co-existence of a morbid one; but if we might hazard another explanation, it would be, that they alter the nature of the secretions poured out, by the chemical influence which they exert in their own elimination. At all events, they universally diminish excessive secretion from the bronchial and genito-urinary membranes; though the power to do so is possessed by some in a much higher degree than by others; while the membrane influenced differs with the article selected for administration. We would adduce, in illustration, the action of *Copaiba* in the cure of Gonorrhœa, and that of *Benzoic acid* or the *balsams* in lessening the excessive expectoration of Chronic Bronchitis.

But of all the remedies which can be denominated stimulant, *Strychnia* and *Brucia* are the most decidedly specific in their action; for while their excitant influence is most powerfully exerted upon the excito-motory function of the spinal cord, we are not aware of their manifesting any operation at all, either upon the rapidity of the pulse, the energy of the mental functions, or the general temperature of the body. There are, doubtless, some who would look upon this as sufficient ground for denying them a place in the class of stimulants at all; but, so far from agreeing with them in this respect, we regard the alkaloids of *Nux Vomica* as presenting the very simplest type of an excitant drug; and we do not hesitate to express our deliberate conviction, that every stimulant which augments the activity of the general functions of the body, does so by the influence, primary or secondary, which it exerts upon the cerebro-spinal centres. We would even be disposed to go a step further, and to hope that the time is not far distant, when Tonics and some of the Diaphoretics, Purgatives, Diuretics, and Emmenagogues, will be removed from their present unnatural connexions, and put side by side with *Strychnia* in the class under our notice.

The therapeutical employment of stimulants is governed by very simple and obvious indications. There are two classes of

cases characterized by defective action in the vital functions, which call for their use; the one, where the departure from the healthy condition is merely temporary, the other, where symptoms are present which point out a loss of tone in the muscular system, and a deeply debilitated condition of the entire frame. Under the former head are included Syncope, and various local nervous affections, as headache, palpitations, etc.; for the relief of which, the diffusible stimulants, such as *Ammonia*, *Wine*, *Camphor*, *etc.*, are particularly effectual. The latter head embraces the more severe derangements of the constitution, in which there is a permanent and decisive depression of vital energy, a condition which is observed in a most marked degree in the prevailing type of Continued Fever. Even in the course of inflammatory diseases, when the local affection is accompanied by typhoid fever and languor of the general circulation, or depends remotely on the influence of debilitating causes, it frequently becomes necessary, while combating the local complaint by topical depletion, to augment the general activity of the heart's action by the frequent administration of stimulant medicines. It is in such cases, where the circulation is depressed, the functions of the mind perverted, and the powers of life distinctly giving way, that the mere *name* of a disease should have no weight in determining the line of treatment which the judicious practitioner should pursue; and it is in these circumstances that his superiority over the mere empiric is most clearly perceptible.

We shall postpone the indications for the use of the Turpentines, Gum-resins, and Balsams, in diseased conditions of the mucous membranes, to the head of Expectorants, and to the special drugs, as they severally come under review. The employment of the specific stimulants of the spinal cord will be advantageously postponed in a similar manner.

SEDATIVES.

As certain remedial agents occasion an increased display of vascular and nervous phenomena generally or in part, so there are others which are altogether possessed of an opposite action, and these are denominated *Sedatives*. It is not an easy matter to define the boundary which marks off this class from

narcotics and refrigerants; fortunately, however, it is of small importance to do so, since remedies embraced by this are also admitted into the other classes. Sedatives may, like stimulants, be divided into those which operate generally, and those which are more specific in their action. The operation of *general* sedatives is exerted then upon the heart and circulation, upon the functions of the brain and nervous system, and upon the tonicity of the muscular fibre. They, accordingly, reduce the contractile power of the heart, an effect commonly judged of by observation of the pulse, which may become weaker and slower, or even more rapid than before; the rapidity being due to an attempt to compensate for the defective power of the weakened organ. The diminution of nervous phenomena is most clearly seen when they are inordinately excited, the mind being restless and the special senses painfully alive to the slightest impressions which fall upon them. The lessening of muscular tonicity is, perhaps, of all others, the most conspicuous effect which their employment gives rise to; being apparent, not only in the general relaxation which follows upon their use, but in the *softened* feel of the artery at the wrist, dependent on the altered condition of its muscular coat. Their fullest effect is syncope or fainting, a suspension, for a longer or shorter time, of the apparent function of the systems affected. *Blood-letting* and *Tartar emetic* exemplify in the highest degree the operation of general sedatives; and although *Digitalis* and *Tobacco* closely resemble them in their action, yet they operate more than either of the former, and specifically, upon the heart.

Just as the alkaloids of *Nux Vomica* operate as *specific* stimulants upon the excito-motory function of the spinal cord, so there are some medicines of this class which in an equal manner depress it. Of this nature are *Hydrocyanic Acid*, *Indian Hemp*, and *Conium*, and these remedies, accordingly, present themselves for use as antidotes to the poisonous action of Strychnia, and as the most probable, because most natural cure for tetanus and hydrophobia; and we find in *Hydrocyanic Acid* a most valuable agent for the removal of many sympathetic phenomena, such as vomiting, palpitations, etc.

We stated it as our opinion, that the primary action of stimulants is exerted upon the cerebro-spinal system; we hold the

same with respect to sedatives, considering their operation to be in all respects the very opposite to that of the former class, although originally manifested upon the same portion of the frame.

The therapeutical employment of sedatives will be readily deduced from the above observations. Inflammatory fever, whether accompanied or not by a localized disease, presents all the conditions essential as indications for their use. The excited heart, elevated temperature, hard and unyielding pulse, and the disordered state of the special senses, call for the administration of remedies fitted to appease their exalted energy; and the great improvement which, in such a case, follows the use of *Blood-letting*, *Tartar Emetic*, and *Digitalis*, bears evidence to the correctness of our practice. The special sedatives of the reflex function are as plainly called for, where this is inordinately excited; Tetanus, Hydrophobia, and Sympathetic Vomiting or Palpitation, have already been mentioned as examples for their use.

REFRIGERANTS.

The power of the body, when in health, to preserve its temperature at a moderate standard, is due to the loss which it every moment sustains by evaporation, and the large quantity of heat which becomes latent in the cutaneous and pulmonary exhalations. In the progress of disease, it often happens that the perspiratory secretion is defective; or there may, on the other hand, be an inordinate evolution of caloric within the body; and in either case a general or local increase of temperature will naturally result. We possess, however, several methods of obviating this; and every remedy which assists in it may be ranked in the present class. The great refrigerant of all is cold in the form of *Ice* or *Cold Water*, either applied to the exterior where it is the skin which abounds in heat, or administered internally where any part of the interior has its temperature raised. Liquids more volatile than water are frequently added to it, for external application to inflamed parts, or to those from which a rapid abstraction of heat is considered desirable. Evaporating lotions, for example, containing *Spirit* or *Ether*, are

commonly alternated with the use of the *Ice* bladder to the scalp, when its temperature is increased in inflammation of the Brain, the powerful reduction produced by the latter being maintained by their constant application. For internal employment again, the cooling power of simple water is augmented by the solution of some neutral salts in it, such as *Nitre*, *Tartrate of Soda*, etc. Diaphoretics and Sedatives, moreover, indirectly operate as refrigerants, the former by influencing the superficial evaporation, and the latter by diminishing the velocity of the circulation by their action upon the heart.

Heat of skin during febrile and inflammatory diseases, and especially the presence of gastric inflammation, indicate the internal employment of refrigerants; while topical and external inflammations very frequently call for the localization of their use.—The *affusion of cold water* over the entire body has, in some hands, been very successful where the heat of the skin has been intense in Synocha and Scarlatina; and, although in the latter disease it is still occasionally employed with benefit, the conditions essential for its use in the former, occur so rarely at present, that it has necessarily fallen into neglect.

NARCOTICS.

Narcotics are remedies which lessen the manifestation of vital phenomena dependent upon the nervous system, especially deadening sensibility and diminishing the motor power, more, however, by reducing the energy of voluntary effort than by paralysing the parts concerned. Their full operation is sleep or coma. *Opium* is the type from which most descriptions of the class have been drawn; but although many narcotics agree with it more or less, yet there are peculiarities to be remarked in the action of each. It is generally supposed that they are primarily stimulant; but this part of their action is very trifling as these medicines are ordinarily prescribed. So great a stress, however, does Dr. A. T. Thomson lay upon it, that he attributes the sedative effect to the consequent collapse. "Narcotics," he says, "strictly so called, operate as diffusible excitants; and this so decidedly, that, by regulating the doses and the repetition of them, the sleep which generally follows their administration may

be altogether prevented, and the exciting influence of the medicine only be obtained: now, the effect of a direct sedative is an immediate depression of the powers of the system without any apparent previous excitement. The symptoms of collapse which follow those of excitement, after the administration of a narcotic, are the consequence of the excitement." This is an opinion by no means generally held; and though, in some instances, the stimulant operation cannot be denied, yet we are rather disposed to regard the two actions as distinct, than as consequent the one upon the other. It would be foreign to our purpose to enter at any length upon the manner in which narcotics manifest their action upon the several functions of the body, differing as they do in this respect among themselves. Suffice it to say, that, as a part of their general sedative influence upon the nervous system, they diminish the secretions of the liver and kidneys, arrest more or less the performance of those functions which severally attach to the different parts of the alimentary canal, retard digestion and constipate the bowels, both by lessening the secretions poured into them and rendering their movements sluggish. The difference of operation of the several members of the class will be most conveniently considered when they come under special review. All we will observe at present is, that some dilate, while others contract the pupil; some appear to concentrate their sedative action more particularly upon the functions of the encephalon, others upon the contractile power of the alimentary or bronchial tubes; while a strict distinction is to be drawn between those which occasion constipation and those which do not; all these things being of great practical importance. As in the case of the two former classes, we are of opinion that the primary action of narcotics is exerted upon the nervous centres, but concentrated most especially upon the brain.

The objects which are mostly in view in the administration of narcotics, are the production of sleep, or the alleviation of pain and spasm. The former is sometimes a most important point to be attained; and, though pain is frequently nothing more than the effect of increased vascularity in a part, it is, nevertheless, a symptom for which the practitioner is often specially required to prescribe, and where there is nothing of this nature to occasion

it, the use of narcotics is particularly indicated. Their antispasmodic value rests upon the same ground with their utility as anodynes.

ANTISPASMODICS.

A not uncommon affection, for which the physician has to prescribe, is Spasm or Convulsion,—an excessive contraction, either durable or intermitting, occurring in a greater or less extent of the muscular system. Dependent, as vital contraction is, upon the nervous stimulus conveyed to the muscular fibre in the state of health, the morbid phenomenon of spasm is undoubtedly referable to the same, exerted in an inordinate degree. *Antispasmodics* are medicines which remove this condition; and few arguments are required to demonstrate how varied their primary action must be, to those who are aware of the numberless causes which produce it. The class may be distributed under *two heads*, namely, those which remove the remote cause of the affection, and those which directly diminish the excitable state of the nerves or nervous centres, either of which will give rise to an increased display of reflex acts. Indirectly, therefore, stimulants and tonics on the one hand, and sedatives on the other, emetics, cathartics, expectorants, etc., may all in their turn diminish spasm and convulsion, according as they remove debility or inflammation, or promote the evacuation of irritant matters from the mucous passages. But the direct antispasmodics are the specific sedatives of the reflex function, and the class of narcotics at large; some of the latter are, in this respect, however, more energetic than others; and, as they do not act alike upon all classes of motor nerves, a due regard must be paid, while selecting them, to their specific operation.

TONICS.

Tone or Tonicity in a muscle, is that continued state of contraction, which its fibres always maintain in the healthy body, and which is not followed by its relaxation. As any special act of contraction is due to an influence originated in the nervous centres, and accompanied by a special change of tissue, both in

them and in the conducting nerves; so we look upon Tone as dependent upon a similar influence, not special but *constant*, originated in the *same source*, accompanied by a *constant* change of tissue, though in a similar way, conducted by the same nerves, and manifested by a *constant* contraction of muscular fibre throughout the body. Under certain conditions of the frame, we have stated this tonic contraction to be morbidly increased, and that sedatives were to be opposed as the remedy; where, however, circumstances are reversed and tone is lessened, the class of medicines now under consideration is employed to restore its energy. We may, accordingly, understand how stimulants, the class most opposed to sedatives, shall act as tonics when administered in small and repeated doses, and one of the specific stimulants especially, namely, strychnia, has been recommended for employment as exhibiting active powers of this nature. With the exception of Iron, we are accustomed to regard Tonics, as acting in the first place upon the nervous centres, and through them, producing their effects upon the muscular system at large.

The operation of a *Tonic*, is manifested most distinctly upon the muscular system. A debilitated patient becomes more capable of prolonged voluntary exertion, and is not so soon fatigued; the pulse acquires firmness and force, the arterial coats having lost the soft and flaccid feel which characterizes their atonic condition. The involuntary muscles generally partake of the same improvement; and not only does the heart drive the blood with greater energy through channels more fitted to convey it to the limits of the body, but the alimentary canal also has its motions rendered more active, and the process of digestion is, in consequence, much better carried on. There will be no difficulty in comprehending, how, with this strength of circulation and more perfect digestion, every other function in the body shall undergo a proportionate improvement. *Iron*, however, appears to act in a different manner from other tonics, although, the ultimate result of its operations is in a great measure similar. It is rather an improver of the blood than a medicine affecting in the first place any one particular system, although, in accomplishing this, it operates indirectly upon all. Iron, we know to be an important ingredient of the red particles of the blood, and where

these are defective in number, a vast host of morbid symptoms present themselves, which call for the administration of this remedy as their natural cure.

The state of debility which is often met with, where the loss of colour of the cheeks and lips is *not* its most decided indication, demands the use of the ordinary remedies of this class for its removal. An atonic state of the heart and arteries, necessarily gives rise to an irregular distribution of blood through the entire system, which may resnlt either in its general or local disorder; presenting the form of local congestion, determination of blood, or inflammation; exhibiting itself under the form of neuralgia, spasm, or convulsion; or laying the subject of it more open to the operation of infectious and malarious influences. It is not then in muscular weakness only, that Tonics are to be employed, —all the numerous complaints which follow in its train are also removed by their use, as soon as the balance of the circulation is restored. Thus it is, that, by curing Palpitation and Convulsion, Epilepsy and Chorea, they become classed with antispasmodics; by relieving Neuralgic Pain, they prove sedative or anodyne; while by local inflammations, congestions, and determinations of blood disappearing under their use, they may almost be regarded in the light of antiphlogistics.

But we have yet to mention a singular but valuable property, which the most powerful of the class possess, namely, that of curing diseases of *periodical* recurrence. The type of these is intermittent fever or Ague, but the same malaria which occasions this, bestows a similar character upon many other affections. Headache, especially hemicrania, neuralgia, toothache, rheumatism, deafness, dyspnœa, convulsions, or even palsy, may thus assume a periodical form; these and many other phenomena being then recognised as *masked agues. Quina, Cinchonia,* and *Arsenic* are the tonics to which they most readily yield. We are so little acquainted with the laws which govern periodicity, that no attempt can at present be made to explain the action of these medicines; all we know being, that tonics are not the only class of remedies which are thus effectual; others which powerfully affect the nervous system, such as narcotics and emetics, operating in a similar manner.

ASTRINGENTS.

Medicines whose administration has the effect of lessening excessive secretion and arresting hæmorrhage, are denominated *astringents*. There can be little doubt, whatever the part of the general system first affected may be, that their last operation is exerted upon the blood, or upon vessels from which the blood or secretion is poured out. Much doubt prevails as to the mode in which they produce their effect, although many of them, in small doses, are distinctly tonic, while others are reputed sedative. This division of the class is adopted by Dr. A. Thomson. Those obtained from the vegetable kingdom derive their efficacy from the presence of *Tannic* or *Gallic Acid*.

In considering the propriety of calling in the aid of a remedy of this class for the arrest of an excessive discharge, whether by its general or local operation, the state of the general system, as regards the presence or the absence of plethora, requires to be carefully considered. Should the hæmorrhage or flux be accompanied by a distended condition of the blood-vessels generally, it must be regarded as the natural mode of spontaneous relief. Interference with it under these circumstances would not only be useless, but might be productive of the most serious calamities; and, so far from an attempt at its control being commendable, the very opposite mode of treatment often requires to be practised. If the bleeding or the loss of fluid by secretion be of itself insufficient to lessen the amount of the circulating fluid, it becomes the part of the physician energetically to assist in its reduction by means of active depletion. When the vascular fulness is reduced in this way within moderate limits, or when signs of debility have from the first accompanied the discharge, astringents are indicated for employment. We would lay down the same rule with respect to their internal or external use, when the fulness is merely local.

EMETICS.

Emetics are medicinal agents which give rise to the act of vomiting. A close examination manifests most important differences

in the medicines which this definition includes. Some of them act immediately, or almost as soon as they are received into the stomach, while others allow a longer or shorter time to elapse before they operate. The former are mostly local irritants, which stimulate the nerves distributed on the mucous membrane; and when these are employed the vomiting is a reflex act. *Mustard, Sulphate of Zinc*, and *Sulphate of Copper* produce their effect in this way, being what have been termed *direct* emetics. The other division of the class embraces medicines which must first enter the general circulation; and of this nature are *Tartar Emetic* and *Ipecacuan*. These possess, moreover, another peculiarity, which is, that their full effect is preceded for a longer or shorter time by nausea, more or less depression of nervous energy, muscular relaxation, and a feeble or irregular pulse. Copious sweating, purgation, and sleep, very often succeed to their action.

In the case of the direct emetics, the part which the nerves and spinal centre take in the accomplishment of vomiting scarcely admits of question; nor, on consideration of their entire effects, can we doubt that the other medicines of the class also act through the medium of the nervous centres. Dr. Paris appears to adopt a similar opinion to this, when he observes that "we cannot hesitate to admit that the influence of the nervous system is indispensably necessary for producing vomiting," grounding it upon the fact, "that this act will not take place, however forcibly the stomach may be goaded by emetics, where the energy of the nervous system is suspended;" whereas, when "its irritability is increased instead of being paralysed, vomiting is excited by the slightest causes."—(*Pharmacologia*.)

Several objects are held in view in the administration of emetics, having reference both to the evacuation of the stomach itself, and to the influence which the act exerts opon other functions. The former is plainly an important point to gain, where poisonous matters have been introduced, or when the food remains within the stomach in an undigested state, producing disagreeable symptoms by the chemical changes it undergoes, and the irritation it occasions to the organ itself. It is often difficult to produce vomiting when poisons have been swallowed, especially those of a narcotic nature; and for their expulsion, the most powerful of the direct emetics require to be exhibited. In

Dyspepsia, on the other hand, vomiting is often brought about with the greatest ease, a draught of warm water, with or without titillation of the fauces, being mostly sufficient for the purpose; and, should it not be so, *Ipecacuan* is the fittest drug to be employed. But vomiting has more extended relations; it brings into combined action the same muscles as are engaged in the acts of coughing and expectoration, the phenomenon itself being one closely allied to them; and accordingly it is found, that the operation of an emetic is a most effectual means of unloading the air-tubes of the excessive secretion, which sometimes accumulates within them to a distressing amount. The daily use of an emetic is also, in our experience, though an unpleasant, yet a highly valuable remedy in Consumption, especially in its early and middle stages, lessening dyspnœa, augmenting the strength, and distinctly diminishing the frequency of the cough and the quantity of expectoration. We cannot affirm, however, any improvement to have taken place in the essential physical signs of the disease; and the debility of the latter stage for the most part forbids its employment.

Vomiting, moreover, makes a most powerful impression upon the system generally. The nausea which precedes it, by diminishing tone, and equalizing the circulation, probably in great measure conduces to this end. We refer to the operation of emetics in fevers and inflammatory diseases. In Continued Fever, the administration of an emetic is said by some experienced physicians to cut short the disease at once; and, in the case of synocha, to hasten its resolution by a critical sweat; but, however little this may accord with our observation in modern epidemics, one thing is certain, that in this, as well as in the exanthemata, the early use of an emetic exercises a most favourable influence over the future progress of the disease. The same may be said in respect of inflammatory affections of the lungs, trachea, tonsils, etc., which are, however, much more readily cut short in this way than the true idiopathic fevers.

We would, in the last place, repeat what we have before stated with regard to the anti-periodic operation of this class of remedies; an emetic made to act at the commencement of the cold stage of Ague, or just before it is expected to set in, even if it should not completely cut short the paroxysm, nevertheless renders it of a much milder character.

CATHARTICS OR PURGATIVES.

Purgatives are medicines which, within a short or given time after exhibition, produce the evacuation of the bowels, whether they have been received through the stomach or applied more immediately to the rectum. This is nearly in the same words as the definition adopted by Dr. Hamilton, in his justly celebrated work on the *Utility of Purgative Medicines;* and it is one which, recognising, as it does, only the final result of their operation, cannot interfere with any division which may hereafter be made of the class. The remedies it includes, however, have several varieties of action, which adapt them for the fulfilment of different therapeutical indications; and these varieties become apparent, either on inspection of the stools which they severally produce, or on regard being paid to the symptoms which accompany their operation. The terms laxative, hydragogue, drastic, etc., have accordingly been applied to them; and, although some epithets which they have received, are founded on erroneous and short-sighted views of their *modus operandi*, yet those we have enumerated, at least, are recognised in the experience of every practitioner. A purgative is denominated *laxative*, when it operates so mildly as "merely to evacuate the contents of the intestines, without occasioning any general excitement in the body," or any extraordinary increase of watery secretion from the vessels of the canal. This is the case with *Senna*, *Manna*, and *Sulphur*. The term *Purgative* is emphatically used by way of designation for those which "produce a considerable influx of fluid from the intestinal vessels, and extend their stimulant effect to the system in general; and where these effects are very violent, the purgative is further distinguished by the epithet *Drastic*." (*Paris, op. cit.*) *Hydragogues* belong to this division; those which produce the greatest flux from the intestinal membrane, and, consequently, the most watery stools, passing under this term. The operation of a Drastic is generally accompanied by disagreeable symptoms both of a general and local nature, nausea and sometimes vomiting, faintness or actual syncope, thirst, more or less feverishness, headache, griping or heat and straining in evacuation. The medicines, in these cases, appear

not only to augment the flow of blood through the vessels of the part, but to irritate its sensory nerves, and excite sympathetic disturbance of the system at large. Some produce these distressing effects in a more marked degree than others, but all may be said to do so more or less.

Different cathartics have acquired a reputation for acting, in a specific manner, upon different parts of the intestinal canal. We have no hesitation, however, in rejecting many erroneous views which have been advanced on this head, which succeeding experience has shown to be so. The special operation of calomel upon the liver and duodenum is one of this nature; and though we are willing to admit that *Mercurials* have the power of increasing the biliary secretion,* all practical men, unbiassed by the prejudices imbibed in their youth, consider this as but a part of the effect they produce upon the secretions generally. We would wish especially to impress this point; because it is an error which has not only infected the minds of a very large majority of practitioners of medicine, but is continually being repeated in the ears of students in the lecture-room. One point, however, with regard to the specific action of purgatives appears to be pretty clearly established; and it is this, that some act more especially by increasing the amount of fluids poured into the canal, and others more particularly by stimulating its peristaltic movements. This, however, is a mere question of excess, both apparently possessing the two kinds of action conjoined; the stools produced by the full operation of *Aloes*, for example, are more fluid than natural, while those which *Colocynth* occasions are expelled with straining and force.

Little is known for certain, with respect to the mode in which purgatives produce their effects. With regard to those which increase the watery secretions of the canal, something is doubtless due to the local irritant operation of the remedy, and some-

* Healthy human fæces contain scarcely a trace of *real* biliary matter (*Choleic Acid*), but merely the fatty and colouring principles of that fluid; when, however, certain purgatives, such as calomel, are taken, a considerable amount of it is discovered in the stools. Simon found 21·4 per cent. of the organic matters of the bile in the dried fæces after the operation of a large dose of calomel. May not this elimination of bile prove serviceable in certain cases where the respiration is abnormally defective? A. B. G.

thing, when the *saline* purgatives are administered, to the mechanical phenomena of endosmosis. How far the nervous system is engaged in the increase of the peristaltic motions of the canal is undetermined, though probably more than it generally gains credit for.

Of late years the use of this valuable class of medicines has become very general in the management of almost every form of disease; a constipated, or at any rate an irregular condition of the bowels being an accompaniment of most of those for which the physician is consulted, exercising, so long as it is permitted to continue, a most injurious influence over the progress of the complaint. The credit is due to Dr. Hamilton of having put this fact prominently before the notice of the profession, while he showed that, even in typhus, the debility formerly so much dreaded was not augmented by purgatives. Since his time, the intimate connexion between a variety of disorders and fæcal accumulation has not only been fully recognised, but the practical rules which he enforces have been most beneficially acted upon. But, besides purgatives being employed for the purpose of obviating constipation and its consequences, they are also administered with a view of obtaining their hydragogue, antiphlogistic, and derivant operation. As hydragogues, they are of use in the several varieties of Dropsy, being the most effectual means of diminishing the liquid poured into the cellular tissue and serous cavities of the body. The reduction they cause in the watery parts of the blood, and so of its general bulk, renders them valuable parts of the antiphlogistic treatment of febrile diseases. Their derivative action also is of no small importance when they are exhibited in local Inflammations, and especially in the management of such acute and chronic affections as occur in the membranes and substance of the Brain.

DIURETICS.

Diuretics are medicines which increase the secretion of urine. A definition such as this, however, refers only to one point, namely quantity; but many members of the class have a more extended action, and modify its quality also. Both are important; diminution in quantity, unless compensated by the increase of

some other liquid secretion, implying the retention of a certain amount of water in the system, whose presence may occasion a variety of dangerous results. Alterations in quality also, excess or defect of some of its healthy constituents, cannot occur to any great extent without corresponding morbid symptoms presenting themselves to our notice. The administration of *Potash* and its carbonates readily occurs in illustration of the latter mode of operation.

When reviewing the remedies reputed diuretic, with a view to their adaptation to the removal of disease, we cannot but observe that some are of a *stimulant* and others of a *depressing* nature; and this division is one which influences, in a great degree, the minds of practical men, when selecting the medicine to be employed in an individual case. *Cantharides*, *Turpentine*, *Spirit of Nitric Ether*, and *Juniper*, for example, are believed to be stimulant in their action on the kidneys, the increased flow of blood which they produce through the organs unfitting them for use when this would be likely to give rise to injurious effects. *Digitalis*, on the other hand, is a diuretic of the *sedative* species, and may be unhesitatingly administered, along with depletive treatment, where the former would be strongly contra-indicated by the presence of vascular activity.

Very little is certainly known with regard to the *modus operandi* of this class of medicines; and perhaps it is on this ground, and the consequent want of any theoretical rules for guiding us in their management, that the inconstancy of their operation is so much complained of. So far as the alterations in the constitution of the secretion itself are concerned, perhaps the explanations of Professor Liebig, formerly noticed (p. 23), are as probable as any, but they do not account for the increased determination of blood which takes place when the stimulant diuretics are employed, and to which their peculiar operation is to be attributed. From the close correspondence between this and other forms of local determination of blood, as blushing, the flow of tears and that of saliva, and the well-known influence of affections and passions of the mind upon them all, we regard it as far from unlikely, that some of them may operate in the first place on some part of the nervous centres. In the case of *Cantharides*, a marked stimulant action of this kind has not only

been ascertained, but availed of in practice in certain conditions of palsy. They may, and with great probability, be also supposed to operate, by the topical excitement they afford to the kidneys in their process through them for excretion; and, in the case of the volatile oils, as *Turpentine* and *Juniper*, this is far the most likely explanation which can be given.

It is in Dropsy especially that Diuretics are indicated for employment, though often less efficacious for its removal than the class last considered. A course of purgatives also, by removing a congested state of the kidneys, frequently paves the way for a more satisfactory result of their use. The moderate exhibition of Diuretics sometimes aids in the removal of fluxes from other mucous membranes, as of the lungs and alimentary canal. They are commonly prescribed, also, by some practitioners, in Febrile and Inflammatory diseases generally.

SIALAGOGUES.

Substances which draw forth an increased secretion from the salivary glands, are known under the term of *Sialagogues.* The *modus operandi*, however, of the different members of the class is most distinct. Many are *local irritants*, such as *horse-radish*, *ginger*, etc., and, when used as masticatories, elicit a copious discharge of saliva and mucus into the mouth, the latter, by their topical stimulant operation, and the former, by the impression which they make on the sentient nerves, their operation being probably analogous to those phenomena denominated reflex. Sialagogues of this kind are employed as derivants, the augmented secretion being accompanied by an increased determination of blood to the organs which pour it forth; and this, occurring in one direction, is practically found to lessen an excessive flow in another. On the other hand, there are medicines whose sialagogue operation is produced in a more secondary manner, and does not appear at all, until a powerful impression has been made on the general constitution; and we need not state, that *Mercury* is the principal drug included in this division. Its value is not dependent, however, upon the salivary flow which its administration induces; for though frequently, under its fullest operation, several pints of fluid may be

daily discharged, yet this is by no means essential for its remedial action to be exerted in the removal of disease. Perhaps the most correct guide which we can adopt, is to look upon the affection of the salivary glands as a mere sign of its constitutional influence being attained, and, for the most part, to stop short of this, contented with producing its earliest effect of swelling and inflammation of the gums. The theory of action of the *constitutional* Sialagogues we confess our entire ignorance of: mercury augments every secretion of the body before this; and it might be expected that the saliva would have been as soon increased as the rest, had this been but a part of its general operation. We shall refer the remedial value of *Mercury* to its separate head in the body of the work, merely remarking, that, as soon as the mouth becomes affected, many morbid actions which had been proceeding in the frame have been found to cease, and recovery from that time often steadily to progress. The topical Sialagogues are employed as masticatories for the removal of toothache, neuralgia, and other painful or sub-inflammatory affections of the head and face.

ERRHINES.

Errhines are substances, whose application to the lining membrane of the nostrils, gives rise to an increased discharge of mucus, sometimes exciting the act of sneezing in addition. The latter is well known to be a reflex phenomenon, the former is most likely due to the vascular fulness which the local action of the stimulant occasions, a flux from the affected part being its natural mode of relief. The force with which the air is driven through the passages in the act of sneezing, causes the expulsion from them, not only of mucus, but of other foreign substances also which they may accidentally contain. The therapeutical value of the class, is dependent on this double operation. The increase of the secretion is of service, by deriving from parts in the immediate neighbourhood of the nose; and Errhines are accordingly employed with benefit in some forms of headache, and in chronic affections of the conjunctiva. Their sternutatory action is desirable, where, as sometimes happens, the nostrils have become blocked with one or more masses of hardened mucus,

or where foreign bodies have gained access to the cavity, both of which may be productive of very distressing results, unless dislodged by the act of sneezing. The violent expiration in which sneezing essentially consists, may be also of occasional service in expelling the false membrane, which accumulates in the trachea in croup. But the act itself is a sudden one, engaging in energetic action many nerves and numerous muscles, in such a way, that a powerful impulse is afforded to other dormant functions also. Thus it is, that sneezing stimulates the tardy energy of the mental faculties; or, produced in some forms of protracted labour, excites to more effectual exertion the sluggish contractions of the uterus upon its contents.

EXPECTORANTS.

Medicines which promote the expulsion of mucus or other matters from the air-passages by the act of coughing, are termed *Expectorants.* The facility with which they may be discharged, depends in part upon the force with which air is driven through the tubes, and in part upon the condition of the matters themselves. As regards the latter point, however, apparently contradictory statements are met with, an increase and a diminution of the spissitude of the secretion being at different times proposed as favourable to the performance of the act. Both are perhaps correct: at any rate they are changes which the practitioner has in view in the management of pulmonary complaints. In Bronchitis for example, and in Pneumonia, the active employment of *Tartar Emetic*, and other antiphlogistic treatment is observed to lessen the glutinosity of the sputa, and an almost constant accompaniment of the change, is a greater facility of expectoration. The administration of *diluted alkalies* is believed by Dr. Williams to be productive of the same effect. Medicines undoubtedly exist, classed for the most part with expectorants, which lessen the secretion from the morbid surface; but whether they possess the power merely of thickening it, we are hardly prepared to state. We observe the former operation, when the *balsams*, *turpentines*, and *gum resins*, are exhibited in chronic bronchitis, phthisis, or bronchorrhœa, as also when a dry diet, or hydragogue purgatives are employed in similar cases. The

other principal mode in which expectorants operate, is by increasing the energy of the act itself. Various remedies, stimulants, tonics, and emetics, with sternutatories, are included under this division, being such as either temporarily or permanently increase the activity of the nervous and muscular functions, or, by calling into play the same special muscles with augmented force, assist their efficacy when applied to the performance of expectoration. It consequently remains for the prescriber, when making his selection from among the class, to consider on what cause the difficulty of expectoration depends, and to adapt his remedy to the peculiarities of the case.

DIAPHORETICS.

Diaphoretics or *Sudorifics,* are medicinal agents which increase the secretion of the sweat. They are divisible into two orders, namely, those which possess a *stimulant* action on the general system, or exert their excitant influence on the skin alone, and those whose primary action is *sedative.* These are severally adapted for two forms of suppressed perspiration, met with every day in professional practice. Where it is the result of the application of cold to the surface, in consequence of which a contracted state of the superficial vessels has been followed by a hyperæmic condition of internal organs, and before the latter has passed into any degree of activity, the use of powerful stimulants, either general or local, often succeeds in restoring the balance of the circulation, and eliciting the secretion of sweat. It is on this principle, that an incipient catarrh is often successfully treated by hot *spirituous drinks* or the *warm bath.* In another class of cases, the diminished perspiration forms merely a part of some general and severe disorder of the health, passing under the name of one of the varieties of fever. Sedative medicines are then the only effectual sudorifics: *cold affusion*, *cold water* or *iced drinks*, *tartar emetic*, etc., lessen the impetuosity of the heart's action, diminish the vascular tonicity, and enable the skin, as well as other secreting organs, to resume the exercise of its proper functions.

EMMENAGOGUES.

The menstrual discharge which periodically recurs from the female system, is a function of her genital organs of the most important nature. It would appear as if the female organism were endowed with a capacity of producing all parts necessary for its nutrition, in a "greater quantity than is required to supply its daily waste." This excess, during part of her existence, is employed in the reproduction of her species, in the formation of new individuals possessing textures and organs similar to herself; but when this is not proceeding, it becomes necessary that some other channel should be provided, by which the superabundant material may be discharged; and this is accomplished, at the period of puberty, by the establishment of the catamenial flow. Under certain conditions of the general system, or of the genital organs themselves, it may be delayed beyond the period usually allotted to its first appearance, or, being regularly set up and continued for a time, may either cease to occur, or its quantity be more or less diminished. This is the state which passes under the term Amenorrhœa, and which the administration of *Emmenagogues* is calculated to cure. The most usual causes of the deficiency, are the two opposite states of the vascular system of plethora with excessive tone, and of anæmia with defective tone; or, in other words, both a too robust, and a too debilitated condition of the frame. It is evident, then, that medicines designed to act as Emmenagogues in such cases as these, must be calculated for the removal of these conditions, according as either may chance to predominate, opposite remedies acting in this respect in producing the same effect. For the one, *Blood-letting*, *Antimonials*, and active *Purgatives*, are effectual; in the other, *Good Living*, *Country Air*, *Iron*, and *Tonics*, are especially indicated. It occasionally happens, however, that a simple regard to the state of the vascular system, and setting right whatever may be wrong in this quarter, although it produces a more desirable state of the general health, does not suffice to restore the periodical evacuation. In this case, we must transfer our treatment to the secreting organ itself. The uterus is apt occasionally to require either *special depletion*, or the employment of *special*

stimulants; and the latter are commonly regarded as *direct* Emmenagogues. Some of these are agents which occasion a determination of blood to the pelvic organs generally, as their peculiar and specific operation, including the uterus among them: of this nature are *Aloes* and other purgatives, whose action is especially concentrated upon the lower intestines. Others have an independently powerful effect upon the nervous centres, and must be looked upon as acting primarily upon them in the accomplishment of their final object: among these, *Cantharides* and *Ergot of Rye* stand conspicuous; and the latter is known to affect the contractile tissue of the uterus, when received into the general circulation.

ANTACIDS.

Diluted Alkalies and *Alkaline Earths* with their *Carbonates,* when taken into the stomach, neutralize by their chemical action an acid state existing in its contents; and hence such remedies have acquired the denomination of *Antacids.* This, however, is not their only operation. It has been found that where this condition of the stomach habitually occurs, as well as in other cases, the *urine* also becomes more than ordinarily acid in its reaction, acquiring a tendency to lithic acid deposits, either in the urinary organs themselves, or after its expulsion from the bladder. Alkaline remedies are accordingly prescribed for the removal of this, as well as for the correction of the stomach affection. Their action is for the most part believed to be entirely chemical, although some have advanced the opinion that "their utility is not confined to their chemical action:" Dr. A. T. Thomson states his belief that they act also by allaying the irritability of the stomach; and "that it is to this influence of Antacids, that we are to ascribe much of the benefit derived from their employment in acidity of the primæ viæ." In some cases of diarrhœa, where acidity of the secretions and contents of the intestines keeps up an excessive discharge, *Chalk* is very commonly and effectually administered.

DILUENTS.

Diluents are liquids whose administration allays thirst, lessens the spissitude of the blood, and renders acrid secretions less irritant and more copious. We have here, then, three conditions which demand their use. Thirst is an almost constant symptom in the course of febrile diseases, and is often a sign of that deficiency of water in the blood which indicates in an equal degree the exhibition of Diluents. Illustrations of their value in an acrid state of the secretions are found in inflammation of the mucous membranes; copious drinks of *warm or cold water*, or of some *mucilaginous vegetable infusions*, being commonly resorted to in such cases with the greatest benefit. The distressing cough of Bronchitis or Catarrh, which the saline-tasted secretion constantly excites for its expulsion, is popularly treated by this means, and Gastritis and Enteritis benefit more by such simple management, conjoined with the necessary depletion, than by the large doses of irritating purgatives, not only prescribed in the latter of these cases, but too often recommended to the student also for employment. Copious dilution, moreover, is a very necessary part of the treatment of urinary deposits, forasmuch as it is utterly useless to administer other remedies, unless the amount of solvent be increased by the addition of water to the secretion itself.

DEMULCENTS.

Remedies which, either applied externally or taken into the stomach, topically soothe the parts with which they come in contact, softening and lubricating their tissue, are denominated *Demulcents*. *Poultices*, *Fomentations*, *Ointments*, *Cerates*, etc., employed as applications to the exterior of the body, are included in this class. Their employment, in a therapeutical point of view, is too well known to call for much comment, various local inflammations, ulcers, etc., occasionally demanding their use. But the mucous membranes are often treated in a similar manner. For instance, when the tonsils or pharynx are inflamed, gargles composed of a mucilaginous infusion are frequently prescribed;

enemata of a similar character in dysentery, and warm fomentations in tarsal and conjunctival inflammations, with the effect of lessening vascularity and rendering the patient more comfortable, so far at least as his local symptoms are concerned. Even in Bronchitis and Catarrh, the constant solution of some *gum* or *gelatin* in the mouth, lessens very much the irritation at the entrance of the air-passages, which excites the tickling cough so troublesome and constant in these affections.

RUBEFACIENTS AND VESICANTS.

Rubefacients are applications which redden the surface of the skin. *Vesicants* produce a further effect, and occasion not only a superficial excitement of the cutaneous circulation, but give rise to the effusion of serum beneath the cuticle, and the consequent elevation of a blister. All the substances which act in this way are *topical stimulants*, and might have been included in the same class with the general excitants, were it not that their therapeutical value is unconnected with this relation. The end generally proposed in their employment is the production of what is termed counter-irritation. Experience has shown that when the circulation of an internal organ is in an excited state, the establishment of a similar condition in a neighbouring part removes or lessens the pre-existing disease. It is on this principle that the practitioner acts when he employs these remedies in internal inflammation or determinations of blood, whether seated in the great cavities of the body, or localized in the joints or nerves. *Blisters* and *Stimulating Liniments*, however, require some caution in their use. It must be kept in mind that, though their action is local, the general system is more or less excited by their employment; and, accordingly, if fever be present, as in the more acute forms of inflammation, it should be previously reduced by antiphlogistic means; hence they prove of greater service in the *chronic* forms of disease. Some applications which are included in this division have a different effect both from simple Rubefacients and from Vesicants, by giving rise to the appearance of a *vesicular* or *pustular eruption* upon the part on which they are rubbed. This is the case with *Croton Oil*, and with *Tartar Emetic* used in the form of ointment or solution.

Where a prolonged and decided counter-irritant effect is desired, these are invaluable remedies; and in Phthisis and Chronic Bronchial diseases, where the purulent expectoration is abundant, or where limited Bronchitis or Congestion affect the upper lobe of the lungs, their use is especially indicated.

CAUSTICS OR ESCHAROTICS.

Applications to the living tissues of the body, which destroy their vitality and occasion the production of a slough, are denominated *Escharotics* or *Caustics.* The class embraces a variety of substances, all possessing a powerful chemical influence upon organized matter; and it is upon this chiefly that their caustic operation is believed to depend; something, however, is due to the inflammation which they excite having in itself a tendency to terminate in the production of a slough. The stronger acids, as *Nitric*, *Hydro-chloric*, and *Sulphuric*, and, among the salts, *Nitrate of Silver*, *Sulphate of Copper*, *Fused Potash*, and *Chloride of Antimony,* are those most frequently employed. *Heat* is occasionally had recourse to, as where a *red-hot iron* is used, or the *moxa* employed to produce sloughs for the cure of deep-seated disease in the bones or joints. The actual cautery is sometimes the only means which the surgeon can use for arresting hæmorrhage, and it is said to be by far a less painful application than has been usually imagined. Escharotics are employed for various purposes; sometimes to destroy the surface of malignant specific or unhealthy ulcers,—*Nitric Acid*, *Chloride of Antimony,* or some *Arsenical* preparation, being commonly preferred; sometimes to destroy a virus inserted into wounds by rabid or poisonous animals, to open abscesses, and to remove diseased growths.

CHEMICAL INTRODUCTION.

The study of Chemistry is so intimately connected with that of Materia Medica, that it is impossible to attain a knowledge of the latter science without a certain acquaintance with the former. It does not come within the limits of a work like the present, to enter at large into chemical minutiæ; and we must therefore presuppose in our readers a general knowledge of the principles at least of inorganic chemistry; and the object of the present Introduction will be to give a concise statement of the principles of the organic branch of the science, and to furnish a connected view of the composition and leading properties of the compounds contained in the vegetable department of the Materia Medica.

The number of elements entering into the composition of the articles of the Materia Medica, is only twenty-six out of the fifty-five that are known, the names, symbols, and equivalents of which are shown in the following table.

GROUP I.

	Sym.	Eq.
Oxygen . . .	O	8·
Sulphur . . .	S	16·12

GROUP II.

Chlorine . . .	Cl	35·47
Bromine . . .	Br	78·39
Iodine	I	126·57
Cyanogen* . .	Cy—C^2N	

GROUP III.

Nitrogen . . .	N	14·19
Phosphorus . .	P	31·44
Arsenic . . .	As	75·34
Antimony . .	Sb	129·24

GROUP IV.

	Sym.	Eq.
Silver	Ag.	108·30
Sodium . . .	Na	23·31
Potassium . .	K	39·26
Ammonium . .	$N.H^4$	

GROUP V.

Hydrogen . .	H	1·
Copper . . .	Cu	31·71
Zinc	Zn	32·31
Magnesium . .	Mg	12·69
Iron	Fe	27·18
Manganese . .	Mn	27·72
Bismuth . . .	Bi	71·07
Calcium . . .	Cal	20·52

* The compounds Cyanogen and Ammonium have been introduced, because, in combination, they play the part of elements.

SUB-GROUP.

	Sym.	Eq.
Aluminum . .	Al	13·72

GROUP VI.

	Sym.	Eq.
Lead	Pb	103·73
Barium . . .	Ba	68·66

ELEMENTS NOT GROUPED.

	Sym.	Eq.
Carbon . . .	C	6·13
Boron	B	10·91
Mercury . . .	Hg	101·43

We have given this, which has been called the natural arrangement, because the Elements in each group bear a close relation to one another; and by carefully studying the nature of one Element of any group and the compounds which it forms, we have a clue to the corresponding properties of all the others.

For the grounds of this arrangement and its application in simplifying the study of Chemistry, we refer the reader to Professor Graham's Elements of Chemistry, p. 142. (Philad. ed. 119.)

Into the composition of inorganic substances many elements enter; and their arrangement in such compounds is usually very simple, assuming mostly a binary form, or composed of two or more such binary arrangements [as (Na O), or ($S\,O^3$), or (Na O + $S\,O^3$)]: the compounds also in general possess considerable stability. But in organic bodies we find that but few elements are required, only six entering into the composition of all substances derived from the organic kingdom: these are Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, and Sulphur; but these elements possess properties peculiar to themselves, combining with each other in almost every proportion, and in an almost infinite variety of ways; each combination giving rise to a distinct compound.

Organic bodies, moreover, possess but little stability, small disturbing agencies breaking them up into more simple compounds, until at last they are resolved into bodies found in the inorganic kingdom. It is upon this principle that their mode of analysis is founded.

Method of Organic Analysis—Mix the substance to be analyzed with black Oxide of Copper, and heat in a tube; absorb the water which is formed by dry Chloride of Calcium, and the Carbonic Acid by means of a solution of Potassa, and collect

Nitrogen gas (if any) over Mercury. We can then, by subtracting the weight of the Carbon, Hydrogen, and Nitrogen, from the weight of the substance, determine the amount of Oxygen. The amount of Nitrogen can be otherwise determined by adding a strong base, as Potassa, to the substance to be analyzed, and collecting the *Ammonia* evolved. The explanation of these modes of analysis is this: organic bodies in presence of Oxide of Copper (a compound readily parting with its Oxygen) at a red heat, are resolved into Carbonic Acid, Water, and Nitrogen; any Oxygen required to convert the Carbon into Carbonic Acid, and the Hydrogen into water, being derived from the Oxide of Copper. Again, organic substances containing Nitrogen, when heated with a caustic alkali, evolve the Nitrogen they contain in the form of Ammonia, which can be collected by means of Chloride of Platinum, which forms an insoluble double salt with it— [$Pt\,Cl + N\,H^4\,Cl$.]

Two or more organic bodies may possess in 100 parts the same amount of their component elements, and yet be distinct compounds. They are then termed *Isomeric.* This is the case with Oil of Turpentine and Oil of Lemons; each contain in 100 parts 88·46 of Carbon and 11·54 of Hydrogen. Here the difference can be easily explained: for each equivalent of Oil of Turpentine contains 20 eqs. of Carbon + 16 eqs. of Hydrogen $= C^{20}H^{16}$, whereas the formula for Oil of Lemons is $C^{10}H^{8}$. This is proved by adding Hydro-chloric Acid to each, which forms white compounds (artificial camphors); that from the former having the formula $C^{20}H^{16}$, $H\,Cl$; that from the second, $C^{10}H^{8}$, $H\,Cl$. We may, however, find two substances having the same composition in 100 parts, and also the same atomic weight, the difference in this case arising from the different arrangement of the atoms in the two compounds. One of the best examples of this fact is seen in the Formiate of the Oxide of Ethyle and the Acetate of the Oxide of Methyle:

	Oxide of Ethyle.	Formic Acid.
Formiate of Oxide of Ethyle	C^4H^5O,	$C^2H\,O^3 = C^6H^6O^4$
	Oxide of Methyle.	Acetic Acid.
Acetate of Oxide of Methyle	C^2H^3O,	$C^4H^3O^3 = C^6H^6O^4$

Formic Acid bears the same relation to Oxide of Methyle or to

Wood Spirit, as Acetic Acid does to Oxide of Ethyle or to Alcohol.

That the elements in these two substances are arranged in a different manner, is proved by decomposing them by heat with Hydrate of Potassa: the first yields Alcohol and Formiate of Potassa; the second, Wood Spirit and Acetate of Potassa.

ORGANIC VEGETABLE PRINCIPLES.

In the study of the vegetable department of Materia Medica, we shall find that there are certain proximate principles which form a part of the composition of most of the articles; whilst others are met with very rarely, sometimes only in one or two; and we may conveniently divide vegetable principles into two classes:—

1st. Those common to all vegetable bodies.

2d. Those peculiar to certain orders or genera of plants.

The 1st class can be subdivided into

α. Those principles containing Nitrogen in their composition.

β. Those devoid of that element.

Class I.

Principles common to all Vegetable Bodies.

α. *Principles containing Nitrogen.*—These are Fibrin, Albumen, and Legumin, or Caseine; which three compounds, until very lately, were not viewed with much interest; but Mulder has proved that they are identical with the substances bearing the same names and derived from animal bodies; and that animals have not the power of forming such principles, but must derive them from the vegetable kingdom. All three bodies resemble each other very much in composition, and contain a substance called *Proteine*, united with varying proportions of Phosphorus and Sulphur. If they are digested in a weak solution of Potash, they dissolve; and Acetic Acid added to the solution in slight excess, causes a white precipitate consisting of Proteine, which has the composition $C^{40}H^{31}N^{5}O^{12}$, and is represented by the symbol Pr.

Fibrin.—Derived from vegetable juices, from which it separates by standing, in the form of a slight coagulum. It is also contained in large quantities in Gluten, or the substance remaining after wheaten flour has been kneaded with water. It is insoluble in water; but by long boiling, a part becomes altered from oxidation: it swells up in Acetic Acid; and by heat it is dissolved in small quantities. It is soluble in alkalies, and when heated with them is decomposed, and evolves Ammonia. When heated with Hydro-chloric Acid, it, as well as the rest of the Proteine compounds, communicates a purple tinge to that fluid. Its composition may be represented by $10\ Pr+S+P\frac{1}{2}$. When dissolved in a weak potash solution, the Sulphur and Phosphorus separate, and Sulphuret of Potassium and Phosphate of Potassa are formed, the Proteine remaining in solution, from which Acetic Acid precipitates it.*

Albumen.—Contained in vegetable juices, and also in the seeds and other parts of plants. It exists in two states, coagulated or uncoagulated. When vegetable juices are heated to 160° F. they generally become turbid, from the Albumen contained in them coagulating. The chemical properties and composition of Albumen are almost identical with those of Fibrin. The formula is $10\ Pr+S^2+P\frac{1}{2}$.

Caseine or *Legumin.*—Found in large quantities in the Leguminosæ, as in Peas, Beans, Lentils, etc. Its physical properties are uncoagulability by heat, which causes a scum to form on the surface, but ready coagulability by any, even the weakest, acid. The chemical properties are very similar to those of Fibrin and Albumen, and the composition is represented by $10\ Pr+S$.

β. Principles not containing Nitrogen.—In the second subdivision we find some of the compounds possess the peculiarity of having their Oxygen and Hydrogen in the proportion to form water; such is the case in Starch, Sugar, Lignin, etc., and these bodies are called *Amylaceous.* They possess the property of charring when Sulphuric Acid is added to them, which may be supposed to depend on the property which Sulphuric Acid has of

* The Sulphur is readily detected in these compounds by adding Acetate of Lead to their alkaline solutions, and boiling for a few minutes; the Sulphur forms with the Lead a black Sulphuret, which precipitates.

abstracting their water, and hence leaving the Carbon or Charcoal. They are most of them converted into Sugar when boiled for a long time either with an Acid or an Alkali.

In other compounds belonging to this subdivision, we find that the Hydrogen is to the Oxygen in much greater proportion than in water; such is the case in the Fatty bodies.

LIGNIN.—*Comp.* $C^{12}H^{10}O^{10}$. The basis of woody fibre, constitutes about $\frac{1}{100}$ of dried wood. It can be resolved, by boiling with dilute Sulphuric Acid, into Dextrine, and then into Grape or Starch Sugar.

STARCH.—*Comp.* $C^{12}H^{10}O^{10}$. It is contained in vegetable cells: it occurs in the form of granules covered with an envelope which is not soluble in cold water. The grains of Starch differ very much in size in different plants, from $\frac{1}{10000}$ to $\frac{1}{200}$ of an inch in diameter. We find many different varieties of Starch; thus we have common Arrow-root, Sago, Tapioca, Inulin, Lichen starches, etc. Starch is changed by heat into Dextrine, a soluble starch, having the same composition as common Starch; by boiling with dilute acids, it is also converted into Dextrine, and afterwards into Grape or Starch Sugar. Starch is coloured blue by free Iodine, which substances are tests for each other: the coloured precipitate which falls when Iodine and Starch are brought together is an Iodide of Starch. It is necessary that the solution should be cold for the Iodine to produce this effect. Bromine produces an orange-coloured precipitate with Starch.

SUGARS.—There are different varieties of Sugar, some fermentable, others not so. Among the former class are Cane and Grape or Starch Sugar; among the latter, we find Liquorice Sugar, Mannite, etc.

Cane Sugar.—$C^{12}H^{11}O^{11}$. This variety of Sugar is found principally in the Sugar Cane; but it exists also in the juices of many grasses, beet-root, etc.: it crystallizes when pure in oblique rhombic prisms, it requires only one-third of its weight of cold water for solution, it is also soluble in alcohol. By the action of dilute acids it can be converted into Grape or Starch Sugar.

Grape Sugar.—*Comp.* $C^{12}H^{14}O^{14}$. This sugar exists in grapes, figs, honey, and in most fruits. It can also be prepared from Starch by the action of dilute Sulphuric Acid, also from Lignin.

Grape Sugar is less soluble in water than Cane Sugar; it is

very little soluble in cold alcohol, but more so in hot, from which it is deposited in square tables or cubes. By the action of yeast a solution of Sugar is decomposed; Carbonic Acid and Alcohol are produced: this is called the *vinous fermentation*.

Mannite or Manna Sugar.—$C^6H^7O^6$. It forms the chief part of the exudation from the Fraxinus Ornus or Manna Ash; it exists also in some other plants. It does not ferment.

Gum.—Produced in the greatest purity by the Acacias. It forms, when pure, white transparent masses, which break with a conchoidal fracture. It is dissolved by water and forms a gummy solution. Gum is precipitated by Alcohol and by a solution of Sub-Acetate of Lead, but not by the Neutral Acetate. The substance precipitated by Alcohol is called *Arabine*, and has the *Comp.* $C^{12}H^{11}O^{11}$.

Mucilage.—Very similar to the former substance, found in great abundance in the Mallows, and in Linseed, etc. It is distinguished from Gum by its being precipitated by means of the Neutral Acetate of Lead.

Bassorine.—The insoluble portion of Tragacanth, found also in some other Gums. It swells up in water, and assumes a gelatinous appearance. It dissolves in alkalies.

Pectin or Pectic Acid.—*Comp.* $C^{12}H^8O^{10}$. Another principle found in various vegetable juices. It is precipitated by Alcohol; it swells up in water and forms a transparent jelly. It is this substance which gives firmness to vegetable jellies, as currant, etc.

Extractive Matters.—Certain indescribable matters found in the juices of all vegetables, and similar in properties from whatever source obtained. They probably consist always of the same substance, modified by the presence of Dextrine, Sugar, Inulin, etc. They are sparingly soluble in water, but dissolve easily in Alkalies. Under this name many substances, which have recently been isolated, were formerly described, as *Gentianine*, *Quassine*, etc.

Fatty Bodies.—These bodies, whether derived from the animal or vegetable kingdom, are very similar in properties and composition. Fats and fixed oils are generally composed of Oleine combined with Stearine or Margarine. These bodies are all decomposed, when heated with a caustic Alkali, into a substance

called Glycerine, and an acid which unites with the Alkali and forms a Soap. Thus Stearine is resolved into Stearic Acid and Glycerine; Oleine, into Oleic Acid and Glycerine, etc.

Oleine.—This forms the *fluid* portion of fats and oils, and exists in nearly all of them. It remains liquid at a low temperature. By the action of Peroxide of Nitrogen, or a metallic Nitrate upon it, another fatty body called Elaidine, which is solid at ordinary temperatures, is formed; this is seen in the change which the Nitrate of Mercury ointment undergoes when kept. Oleine can be represented as an Oleate of Glycerine.—*Oleic Acid.* $C^{44}H^{39}O^{4}$. Obtained by saponifying Oleine, and afterwards decomposing the soap with an acid—the Oleic Acid is then set free. When pure, it is an oil, almost colourless, giving an acid reaction to test-paper, sp. gr. less than water. It unites with bases, and forms salts: those with Alkalies are soluble in water: with earths and other metallic oxides, the salts are insoluble: united with lead, as an Oleate of Lead, it forms a great portion of the lead plaster of the Pharmacopœia.

Glycerine.—$C^{6}H^{7}O^{5}+HO$. This is the substance separated from fats during saponification. When pure it is an almost colourless syrup, very sweet, sp. gr. 1·26, converted by Nitric Acid into Oxalic Acid. It is supposed to be a hydrate of the oxide of a radical *Glycerule* ($C^{6}H^{7}$), and so is analogous to Alcohol, Wood Spirit, etc.

Stearine—Forms the solid portion of mutton suet and beef fat. It is decomposed by an alkali into Stearic Acid and Glycerine.—*Stearic Acid* ($2HO+C^{68}H^{66}O^{5}$) forms Salts in the same manner as Oleic Acid.

Margarine—Forms the solid portion of human fat, and of the fat of carnivora; also, of most of the Vegetable Oils. It is composed of Margaric Acid and Oxide of Glycerule.—*Margaric Acid* ($2HO+C^{68}H^{66}O^{6}$) is prepared from Margarine, or by the action of Nitric Acid on Stearic Acid. It contains 1 eq. of Oxygen more than Stearic Acid, which it resembles in most of its properties. The Margarate of Lead forms a portion of the Lead Plaster.

Besides these, in Palm Oil, we find an Acid called Palmitic Acid; in Cocoa Nut Oil, Coco-stearic Acid; and in the Butter of Nutmegs, Cericic or Myristic Acid, etc.; but such of these as

are contained in articles of Materia Medica will be spoken of under their separate heads.

Wax and Spermaceti also belong to this class of bodies.

Class II.

Principles peculiar to certain Orders or Genera.

This class contains those principles which are peculiar to certain orders of Plants; they differ in many respects from those of the first class. In the first place, they do not serve as food for animals; and many of them act very powerfully on the animal economy, and produce poisonous effects.

The formation of these active principles is much influenced by various circumstances, of which the most important, are Light, Cultivation, Age. For instance, Sea Kale, Lettuce, etc., when grown in the shade are edible; but if allowed to grow freely in the light, they become noxious. The Cucumber naturally is very bitter; but when its growth is forced, it serves as an esculent. Many plants, as the Poppy, which are wholesome when young, become poisonous as they arrive at maturity. Season, also, influences the formation of these substances; thus, the Colchicum is quite innocuous in the early part of the year; and cattle will eat weeds in the spring which they reject during the summer. Lastly, it is only in certain parts of the plants, that the peculiar secretions are usually found. They are first elaborated from the sap in the leaves; and, in its descent, appear to be separated by some particular organ, as the bark, wood, and root, or are deposited in the seeds. Accordingly, we find that many poisonous plants yield valuable articles of food, of which the Potato is a familiar instance.

We shall find it convenient to subdivide these principles into—

α. Those which possess Alkaline or Basic properties, called *Alkaloids.*

β. Those *Neutral* in their properties.

γ. Those which possess the properties of *Acids.*

α. *Vegetable Alkalies or Alkaloids.*—These bodies possess very remarkable properties, and form the most active class of vege-

table principles. They all contain Nitrogen; and hence, when heated to destruction, they give off Ammonia ($N H^3$), from their Nitrogen uniting with a portion of the Hydrogen: when heated with Alkalies, they also evolve Ammonia.

The Alkaloids, when in solution, restore the colour of reddened litmus, and possess an intensely bitter taste. They form Salts with Acids, which in constitution exactly resemble those of Ammonia. Now we find that in a Salt of Ammonia, it is not $N H^3$ that acts the part of base, but $N H^3 + H O$, which we may suppose to be the oxide of a Basyle, and to be represented by $N H^4O$, and the name of *Ammonium* has been given to this hypothetical Basyle $N H^4$, which is found to be equivalent to Potassium (K), and able to replace it in Salts, thus—

Sulphate of Potassa is represented by	$K O, S O^3$.
Sulphate of Ammonia	$N H^4O, S O^3$.
Chloride of Potassium	K, Cl.
Chloride of Ammonium, or Hydro-chlorate of Ammonia	$N H^4$, Cl.

In the same way, we find that the Alkaloids, in their Salts, require the addition of an eq. of water; and we may suppose that in them a peculiar Basyle exists, consisting of the Alkaloid with the addition of an eq. of Hydrogen.

Thus Morphia, when united with Sulphuric Acid, may be represented by $C^{35}H^{20}N O^6 + H O + S O^3$, or by $(C^{35}H^{21}N O^6)O$, $S O^3$.—$C^{35}H^{20}N^1O^6$ is called *Morphia.* $(C^{35}H^{21}N O^6)O$ is called the *Oxide of Morphium.*

When an Alkaloid is brought into contact with a Hydracid, direct union takes place, the Hydrogen of the Acid uniting with the Alkaloid to form the Basyle, as is the case with Ammonia; whereas, if a Hydracid be added to a metal, as Potassium, the Hydrogen is evolved.

The Alkaloids agree with Ammonia also, in forming insoluble double Salts with the Chloride of Platinum.

Most of the Alkaloids are solid and fixed; some, however, as those from Tobacco and Hemlock, are liquid and volatile. Most, when pure, are crystallizable. They are usually soluble in Alcohol and Ether, but very sparingly so in water. Their Salts,

however, are more soluble in that medium, except those with *Tannic Acid;* and hence solutions of the Alkaloids are precipitated by infusions of Nut Galls, or other substances containing Tannic Acid.

In the plant, they exist in the form of salts, united with the acids peculiar to the order which contains them.

The *mode of extracting* the various Alkaloids depends in great measure upon their properties. Those that are *volatile*, are obtained by digesting the plant with a solution of potash and heating; by which means the alkaloid is liberated from the acid with which it was combined, and distils over. When *not volatile*, the Alkaloid is to be extracted by digesting either with Water, a diluted Acid, or Alcohol, according as the Salt of the Alkaloid contained in the plants is more soluble in one or the other of these media. From these solutions, the Alkaloid, if insoluble in water, can be precipitated nearly pure, by Ammonia, or mixed with an insoluble salt, by adding Lime, Magnesia, Oxide of Lead, etc., and can be taken up again by Alcohol: or the Alkaloid may be obtained in combination with any given acid, by adding a salt of Lime, Magnesia, or Lead, which contains the acid, when an insoluble precipitate is again formed, and the salt of the Alkaloid left in solution. Examples of these processes are seen in the Pharmacopœia method of making Aconitina, Strychnia, Hydrochlorate of Morphia, etc.

All the Alkaloids possess, in a greater or less degree, *medicinal or poisonous qualities*, which have a close connexion with the botanical structure of the plants from which they are derived. Thus *Atropia* from the Deadly Nightshade, and *Hyoscyamia* from the Henbane, both belonging to the order Solanaceæ, act very similarly on the animal economy, the difference being rather in degree than in character. The same relation exists between *Quina* and *Cinchonia*, from the different species of Cinchona Bark; while between Quina and Atropia, from different orders, there is a marked difference.

From Opium, three Alkalies have been obtained, *Morphia, Codeia,* and *Thebaia.* Little is known of Thebaia; but the two former have been accurately studied, and a curious relation is found to exist between them—

The composition of Morphia is . . . $C^{35}H^{20}N\,O^{6}$
That of Codeia being . . . . $C^{35}H^{20}N\,O^{5}$

so that Morphia contains one atom more of oxygen than Codeia.

This *similarity of composition* is not confined to Morphia and Codeia, but extends also to other alkaloids derived from the same plant or from plants belonging to the same natural order. Morphia is distinguished from Codeia, by its being precipitated from solutions of its salts by Ammonia, by not being soluble in Ether, and by being reddened by Nitric Acid. In their effect on the system, they resemble each other very closely, both acting as powerful narcotics; but Codeia is said to produce considerable irritation of the skin. The common Hydro-chlorate of Morphia contains Codeia.

The Cinchona Barks yield three alkaloids, *Cinchonia*, *Quina*, and *Aricina*. The two former are well known.

Cinchonia . . . . . $C^{20}H^{12}N\,O$
Quina . . . . $C^{20}H^{12}N\,O^{2}$

so that these alkaloids bear the same relation to each other as Morphia and Codeia. The third alkaloid, Aricina, is said to have the composition $C^{20}H^{12}N\,O^{3}$, having therefore the same relation to Quina that Quina has to Cinchonia. Quina differs from Cinchonia in its much greater solubility in Alcohol and water, in the much less solubility of its salts in water, and in being with great difficulty obtained in a crystalline form from Alcohol. In their action on the system, these alkaloids resemble each other very closely.

From the order Apocynaceæ, two alkaloids have been derived, *Strychnia* and *Brucia*, which are frequently found in the same plant:

The formula for Strychnia is . . . $C^{44}H^{23}N^{2}O^{4}$
That for Brucia is . . . . $C^{44}H^{25}N^{2}O^{7}$
Or— . . . . $C^{44}H^{23}N^{2}O^{5}+2HO$

so that Brucia contains one atom of oxygen and two atoms of water more than Strychnia. Brucia is readily distinguished from Strychnia, by being more soluble in water, and being coloured intensely red by Nitric Acid. The Strychnia of commerce contains Brucia, which is the cause of its giving a red colour with

Nitric Acid. In their mode of action on the system they are identical; but Strychnia is much the more powerful.

The plants belonging to the order Solanaceæ contain many vegetable bases. From the genus Solanum (Solanum Dulcamara, Nigrum and Tuberosum), *Solania* has been obtained; from the Hyoscyamus Niger, *Hyoscyamia;* from the Atropa Belladonna, *Atropia;* from the Datura Stramonium, *Daturia;* and from the Tobacco, *Nicotina.* The formula for most of these alkaloids have not as yet been determined, although several analyses have been made, and the numerical results given. *Solania* has been represented by $C^{84}H^{68}N\,O^{28}$; *Atropia* by $C^{34}H^{23}N\,O^{6}$ (?); *Nicotina* by $C^{10}H^{8}N$; the latter is liquid and volatile. The medicinal action of the alkaloids obtained from this order appears to be very similar; several of them, as Atropia, Hyoscyamina, and Daturia, produce dilatation of the pupil, and probably future analyses may show a great similarity in their composition.

The Conium Maculatum, from the order Umbelliferæ, contains a liquid and volatile alkaloid called *Conia:* its formula has been given $C^{12}H^{14}N\,O$ (?).

In the Ranunculaceæ, we meet with *Aconitina* from the Aconites, perhaps the most poisonous principle in nature; and *Delphinia* from the Delphinium Staphisagria. Formula $C^{27}H^{19}NO^{2}$(?).

Among the Endogens, the order Melanthaceæ contains two Alkaloids; *Veratria*, from the Veratrum Album ($C^{68}H^{45}N^{3}O^{12}$); and *Colchicina*, from the Colchicum Autumnale. Their action on the system appears to be similar; Veratria acting as a more powerful irritant, and causing sneezing, etc.

β. Vegetable Neutral principles.—Some of these contain Nitrogen in their composition; in others, this element is absent. Those which contain Nitrogen approach in their properties very closely to the Alkaloids; and it is sometimes difficult to separate them from that class of bodies. They unite with some acids and form crystallizable compounds: they also form insoluble double salts with Chloride of Platinum, and most of them are precipitated by solutions of Tannic Acid. Their solutions, however, do not exhibit alkaline reactions; and the salts which they form are acid.

The most important of these principles containing Nitrogen, are *Narcotine* from Opium, comp. $C^{40}H^{20}N\,O^{12}$. *Chelidonine* from the Chelidonium Majus, a plant belonging to the order Papa-

veraceæ, comp. $C^{40}H^{20}N^{3}O^{6}$, which therefore contains the elements of one atom of Narcotine, *plus* two atoms of Ammonia, *minus* six atoms of water.

Narceine, $C^{32}H^{24}N\,O^{16}$ (?), is another neutral principle contained in Opium. From plants belonging to the order Piperaceæ, as the Long and Black Peppers, also Cubebs, a principle very similar to Narcotine has been obtained, called *Piperine* ($C^{34}H^{19}N\,O^{6}$). Tea and Coffee, and some other plants, contain a principle which has been named *Theine, Caffeine, Guaranine*, from the name of the plants from which it has been obtained. The formula for this substance is $C^{8}H^{5}N^{2}O^{2}$. Cocoa, the produce of the Cacao Theobroma, also contains *Theobromine* ($C^{9}H^{5}N^{3}O^{2}$), resembling Theine very much in properties. These bodies are remarkable for the large amount of Nitrogen entering into their composition, containing more of that element than any other organic compound, with the exception of Urea. With regard to *Theine* also, we see an exception to the general rule of principles from different natural orders differing from each other; but probably these substances may play an important part in the Animal Economy, perhaps in the formation of Bile; but we may not here enter into discussion upon this subject (see Liebig's Animal Chemistry, also Pharmaceutical Journal for May, 1843). *Altheine* or *Asparagine* is a neutral body found in Marsh Mallow, Asparagus, Liquorice, etc. Formula $C^{8}H^{7}N^{2}O^{5}+2\,HO$. It is decomposed by the action of Liquor Potassæ into Ammonia, and Aspartic Acid. The Carbon and Nitrogen exist in this body in the same proportion as in Theine; and it is probable that it may answer a similar purpose in the economy.

In some plants belonging to the orders Amygdalaceæ and Pomaceæ, a neutral azotized principle occurs called *Amygdaline*, having the Formula $C^{40}H^{27}N\,O^{22}$. This body, when heated with Potash, is decomposed in a similar manner to Asparagine, and resolved into Ammonia and Amygdalic Acid. It also suffers another remarkable decomposition by the action of *Emulsine*, a species of vegetable albumen contained in the same plants. When freed from this albuminous principle, Amygdaline undergoes no change by solution in water; but if the smallest quantity of Emulsine be present, decomposition immediately takes place; and we find as the result, Volatile Oil of Bitter Almonds, Hydro-

cyanic or Prussic Acid, Formic Acid and Sugar (see Bitter Almonds). The Volatile Oil and Prussic Acid do not exist ready formed in the Bitter Almonds and Peach Kernels, etc., but are products of the decomposition of Amygdaline contained in these bodies, when water is added. If Alcohol be substituted for the water, the decomposing power of the Emulsine is destroyed, and the Amygdaline dissolves in the Alcohol unchanged.

To this class also belong certain other principles which do not contain Nitrogen, as *Salicine* from the Willow Tribe ($C^{42}H^{29}O^{22}$), *Populine* from the Poplars, *Columbine* from the Cocculus and Menispermaceæ, *Quassine* from the different species of Quassia, *Smilacine* from Sarsaparilla, and *Elaterine* from the Momordica Elaterium.

These substances do not appear to exert much influence on the nervous system; and when they do act powerfully, it is owing to their direct irritant properties; e. g. Elaterine.*

The *Essential Oils* which occur in all odorous plants and give the fragrance to the vegetable kingdom, may also be classed under this head. Many of these consist only of Carbon and Hydrogen, but others contain a small portion of Oxygen. On a cursory view, the oils appear very complex in composition, but most of them can be referred to a very simple type, being some

* The mode of extracting these principles depends entirely on their chemical properties. If the principle is soluble in water, we should make a watery solution of the substance containing it: free this from foreign matters, and crystallize. For example, Theine in Tea is combined with Tannic Acid, Colouring Matters, Gum, and Mucilage. If to an infusion of Tea we add a solution of Subacetate of Lead, it forms a dark-coloured precipitate with the Tannin, Colouring Matter, Gum, and Mucilage, leaving the Theine in solution, from which it can be crystallized by evaporation, after any excess of Lead has been removed by passing sulphuretted Hydrogen through it. If insoluble in water, the substance containing it should be digested in that fluid, to remove as much as possible of other matters; and the principle should then be taken up by some known solvent and purified, etc.: e. g. Narcotine can be prepared from the matter left after the action of water upon Opium, by dissolving it out by Acetic Acid and precipitating by Ammonia.

If the principle be soluble in any particular media, as Alcohol or Ether, and the other substances combined with it not so, these fluids can be used to dissolve it out: e. g. Narcotine can be dissolved out of Opium by means of Ether, Elaterine (together with colouring matter), is taken up from Elaterium by Alcohol; and from this Alcoholic extract the colouring matter can be removed by Ether. Various other methods can be employed, either on account of the peculiarities of the principle itself or of the substances with which it is combined.

multiple or compound of C^5H^4. Many of the essential oils have the same composition in 100 parts, the difference consisting in the numerical value of the Atom.

Oil of Turpentine is expressed by the formula $C^{20}H^{16}$, because it unites with Hydro-chloric Acid in this proportion, to form a solid Compound (Artificial Camphor). *Oil of Lemon* has the formula $C^{10}H^8$, because that is its combining proportion with Hydrochloric Acid. The Oils of Juniper, Savine, Cubebs, Pepper, Copaiba, etc., have a similar composition, their atoms being some multiple of C^5H^4.

The Essential Oils containing Oxygen, can also generally be referred to this type, either as Hydrates or Oxides. Thus:

Oil of Bergamot may be represented by .	$6\,C^5H^4+2\,HO$
Oil of Lavender	$3\,C^5H^4+2\,HO$
Oil of Peppermint	$5\,C^5H^4+2\,HO$
Oil of Rosemary	$9\,C^5H^4+2\,HO$
Oil of Cajeput	$2\,C^5H^4+2\,HO$
Oil of Mint	$7\,C^5H^4+0$
Oil of Origanum	$10\,C^5H^4+0$
Camphor	$4\,C^5H^4+2\,O$

Some of the Essential Oils, however, cannot be referred to this type, those namely which contain Nitrogen and Sulphur, as the Oils of Mustard ($C^8H^5NS^2$), Horse-radish, Garlic, Onions, and Assafœtida.

The Volatile Oils are usually liquid at ordinary temperatures, and have a strong odour more or less agreeable. They are generally lighter than water, and consist of two portions, a solid called *Stearoptene*, or a liquid called *Elaoptene*. They are distinguished from the Fixed Oils, by the stain they leave on paper disappearing entirely on the application of heat. They are very slightly soluble in water, but are soluble in Alcohol and Ether. By exposure, the Volatile Oils absorb oxygen and are converted into Resins; and hence plants containing Volatile Oil generally yield Resin also.

The *mode of preparing* the Volatile Oils consists either in distilling the parts of the plants containing them with water, when the Volatile Oil passes over with the vapour of water and floats

on the surface, or by simple expression when the Oil resides in the Epidermis of the fruit—as in the Orange.

γ. *Vegetable Acids.*—These substances possess the usual properties of acids: they have a sour taste, redden vegetable blues, and form Salts with bases; but we meet among them very commonly Acids possessing the power of uniting with more than one atom of base, and hence called Polybasic, a property very rare in the inorganic kingdom. In this respect they closely resemble Phosphoric Acid, which seems to be a connecting link between the Inorganic and Organic Acids. By heat they are frequently decomposed into more simple acids: thus, *Meconic*, a Tri-basic Acid, is first resolved into *Cominic*, a Bi-basic Acid; and by the further application of heat *Pyromeconic*, a Monobasic Acid, is produced. Some of these acids are met with in many plants; others are confined to one or more orders. Examples of the former are *Tannic*, *Citric*, and *Malic* Acids; of the latter, *Meconic*, *Kinic*, and *Aconitic*.

The *mode of their preparation*, as in the case of Alkaloids and neutral principles, depends partly on their properties. Thus, if Volatile, they are obtained merely by the application of heat; as in the case of *Benzoic* Acid from Gum Benzoin, *Cinnamic* Acid from Balsam of Tolu, Peru, etc., and *Valerianic* Acid from the Valeriana Officinalis.

If the Acids form insoluble salts with any base, they are procured by causing a precipitate by the addition of such base, washing it, and setting the acids free by the addition of a stronger one. The bases most frequently employed in this process, are Lime, Lead, and Baryta; and insoluble precipitates with the vegetable acids are often formed in the preparation of the Alkaloids and other principles. This mode of preparation is employed for Citric, Meconic, Kinic Acids, etc.

The vegetable acids for the most part contain no Nitrogen in their composition, and produce little or no effect on the nervous system. Hydrocyanic Acid is a product of the decomposition of an azotized principle, and does not exist as such in the vegetable kingdom.

The following Table exhibits the composition of the Organic Acids entering into the composition of Articles of Materia

Medica, arranged according to their power of combining with one, two, or three atoms of base.

Tri-basic Acids.

Citric Acid, (Lemons, Currants, Gooseberries, etc.)	$3\,HO, C^{12}H^{5}O^{11}$
Meconic Acid, (Papaveraceæ) . . .	$3\,HO, C^{14}HO^{11}+6\,HO$
Tannic Acid	$3\,HO, C^{18}H^{5}O^{9}$

Bi-basic Acids.

Tartaric Acid, (Crust from Wine, etc.)	$2\,HO, C^{8}H^{4}O^{10}$
Gallic Acid, (Nut Galls, Rose Leaves, etc.)	$2\,HO, C^{7}H^{3}O^{5}+HO$
Kinic Acid, (Cinchonaceæ)	$2\,HO, C^{7}H^{4}O^{4}$
Malic Acid, (Pomaceæ, Polygonaceæ, etc.)	$2\,HO, C^{8}H^{4}O^{8}$

Mono-basic Acids.

Acetic Acid	$HO, C^{4}H^{3}O^{3}$
Aconitic Acid, (Aconites, decomp. of Citric Acid by heat)	$HO, C^{4}H^{2}O^{3}$
Benzoic Acid, (Gum Benzoin, etc.) . .	$HO, C^{14}H^{5}O^{3}$
Cinnamic Acid, (Balsam of Tolu, Peru, old Oil of Cinnamon), etc.	$HO, C^{18}H^{7}O^{3}$
Copaivic Acid, (Copaiba)	$C^{40}H^{30}O^{4}$
Fumaric Acid, (Iceland Moss) . . .	$HO, C^{4}HO^{3}$
Oxalic Acid, (Polygonaceæ,)	$HO, C^{2}—O^{3}+2\,HO$
Pectic Acid, (many Vegetable Juices)	$HO, C^{12}H^{17}O^{11}$
Pinic Acid, Sylvic Acid, } (Resins, ...	$C^{40}H^{30}O^{4}$
Valerianic Acid, (Valerianaceæ) . .	$HO, C^{10}H^{9}O^{3}$
Veratric Acid, (Cevadilla Seeds) . .	$HO, C^{18}H^{9}O^{7}$

INORGANIC MATERIA MEDICA.

CARBO—Eq. = 6.

CARBO LIGNI. L. E. U. S. (*E ligno coctus.*)

PHYSICAL PROPERTIES.—*Form*, pieces having the shape of the branches from which it is prepared. *Colour*, black or brown. *Consistence*, brittle. *Odour and taste*, none.

PREPARATION.—Billets of wood are piled in a heap, and covered over with turf and earth, so as to exclude all access of air, except by a hole at the top, and one or two at the bottom: the heap is then set fire to, and all is burnt off but the charcoal, the air admitted being too scanty in quantity for a more perfect combustion to occur.

CHEMICAL RELATIONS.—When recently prepared, it possesses a power of attracting to itself various principles, as odorous and colouring matters, and also of condensing within its pores many times its own volume of gases. The gases most easily liquefied, are those which are absorbed in greatest quantity; and it is believed that they actually become liquefied in its substance.

OPERATION AND USES.—Its only well-established action is as an antiseptic, for which it is used both topically and internally. Its external use has proved highly serviceable in various forms of *sloughing ulcers*, as those which occur in the mouth from the action of mercury, or in other parts of the body from venereal poison, etc. It may either be sprinkled over the part, or applied in a poultice.

Internally, it has been used to correct the *flatulence* of dyspepsia, and remove the fœtor which accompanies the dejections in some diseased states of the alimentary canal. It is used as a *dentifrice*.

DOSE.—In powder, grs. xx.—ʒj. or more. It may be suspended in water, when used as a gargle for the mouth and throat.

Carbo Animalis. L. E. U. S. (*Ex carne et ossibus coctus.*)

Phys. Prop.—*Form*, a rather coarse powder. *Colour*, brown or black. *Odour and taste*, none.

Prep.—Bones are heated in a covered vessel till no more volatile matters are given off. The animal charcoal thus obtained contains about 90 per cent. of phosphate and carbonate of lime. These are directed by the London College to be removed by digesting in dilute hydrochloric acid, and the *carbo animalis purificatus* is obtained.

Purity.—Hydrochloric Acid should cause no effervescence when digested on pure animal charcoal; and the acid should give no precipitate when neutralized with ammonia. The former effect would indicate the presence of *carbonate*, the latter of *phosphate of lime.*

Chem. Rel.—Its most remarkable property is that of absorbing organic colouring matters and gases; but its absorbing power is by no means confined to these substances.

Uses.—Chiefly to decolorize, as in the preparation of alkaloids, etc.

BITUMEN.

Petroleum. L. E. D. (*Barbadense.*)

Phys. Prop.—Semi-fluid. *Consistence*, about that of cream or treacle. *Colour*, black, or reddish black. *Density*, lighter than water. *Odour and taste*, bituminous.

Prep.—It is a natural product, found floating on the water of some springs in England and Scotland, but most abundantly met with in Barbadoes and Trinidad. [It is also found in the United States, in many places, the most celebrated is that from Seneca Lake, in New York. This variety is much used as a rubefacient; it is more fluid than the Barbadoes, and probably contains more Naphtha.]

Chem. Comp.—It consists of carbon, hydrogen, and a little nitrogen and oxygen.

Chem. Rel.—Soluble in *ether*, and fixed and volatile *oils.*

Oper. and Uses.—Stimulant, both externally and internally. It

has been used as a topical application in the scaly forms of *skin diseases*, and in liniments for *chronic rheumatism*, *neuralgia*, etc. Internally, it increases the secretions generally, and is used chiefly as a diaphoretic and expectorant.

Dose.—f℥ß

Creasoton. L. (*Oxy-hydro-carburetum ex oleo pyroxylico paratum.*)

Creasotum. E. U. S.

Phys. Prop.—An oily colourless liquid. *Taste*, burning and caustic. *Odour*, penetrating and disagreeable.

Prep.—Creasote is obtained from the oil (called pyroxylic oil) distilled from wood tar. The process is very complicated (see Turner's Chemistry).

Chem. Comp.—$C^{14}H^9O^2$.

Chem. Rel.—Creasote forms two compounds with water: $1\frac{1}{4}$ parts dissolve in 100 parts of water; and again 10 parts of water unite with 100 parts of creasote. *Acetic acid* dissolves creasote in all proportions, as also do *alcohol* and *ether*. Creasote coagulates albumen; and flesh saturated with it does not putrefy: hence its name.

Operations.—Externally it acts as a caustic, probably from its power of coagulating albumen. In large doses, like all other powerful irritants, it causes vomiting and purging; in smaller ones, it is said to have the power of allaying vomiting, sometimes causing increased action of the kidneys.

Uses.—It is chiefly employed to relieve *toothache*, dropped into the cavity of a carious tooth. It has been used as a stimulating application to *ulcers*, also as a styptic to suppress *hæmorrhage*. The inhalation of the vapour is often exceedingly useful in diminishing purulent discharge from the pulmonary mucous membranes. Internally, it is used chiefly for the purpose of suppressing *vomiting*.

Dose.—♏j.—v., and upwards.

Off. Prep.—*Unguentum Creasoti.* L. Ointment of creasote. ℨß of creasote mixed with ℥j. of lard. Used in some skin diseases, as porrigo.

PHOSPHORUS. L. U.S.—Eq.=31·44 or $\frac{31 \cdot 44.}{2}$

Phys. Prop.—*Form*, usually in sticks about the thickness of a writing quill. *Colour*, pale yellowish, translucent. *Density*, heavier than water. *Consistence*, flexible; and it cuts somewhat like wax at the usual temperature. *Odour*, alliaceous.

Prep.—*Bone ashes*, consisting of phosphate of lime, are decomposed by digestion with *oil of vitriol* and a *little water*, and phosphoric acid is obtained, holding some phosphate of lime in solution. This is washed out and *evaporated* to a syrup, and the oxygen of the phosphoric acid removed by mixing with *charcoal* and *distillation*. The phosphorus is condensed in a receiver containing water.

Chem. Rel.—It is luminous in the dark, and gives off white fumes when exposed in the dry state to the air, in consequence of undergoing a slow combustion, with the formation of phosphorous acid. It is highly inflammable, friction being sufficient to excite active combustion, and phosphoric acid is then formed. It is soluble in ether and fixed and volatile oils.

Operation.—A very powerful diffusible stimulant, too much so for ordinary use, though its action is equally transitory.

Uses.—It has been administered in cases of collapse from various diseases, as Asiatic cholera, typhus, etc.

Dose.—Undetermined. It should not be resorted to unless with extreme caution.

SULPHUR. L. E. U.S.—Eq.=16·12.

Sulphur Sublimatum.

Phys. Prop.—*Form*, a powder. *Colour*, bright yellow. *Odour*, sulphurous. *Density*, about 1·12.

Prep.—It is prepared either from native or virgin sulphur, or by the decomposition of metallic sulphurets. To obtain it in the sublimed form, it is heated, and the vapour received in a large chamber, on the walls of which it condenses.

Chem. Rel.—It is volatile, soluble in fixed and volatile oils, and burns with the formation of sulphurous acid.

Impurities.—The sublimed sulphur mostly contains some sul-

phuric acid, which is removed by washing with water till it no longer reddens litmus. Arsenic is mostly present in it also.

Operation.—When taken internally it is absorbed, and increases the activity of all the secreting organs, by which it is thrown out of the system. The functions of the skin and most of the mucous membranes are especially increased. It seems to be eliminated from the body in the form of sulphuretted hydrogen; and silver worn about the person becomes blackened. The odour of this gas is also frequently perceptible. In larger doses it acts on the bowels, particularly the large intestines.

Uses.—Internally it is used in various *skin affections*, and to promote diaphoresis in *chronic rheumatism*, *gout*, etc. From its action on the mucous membranes, it is employed in some pulmonary affections of a chronic character. As a laxative, it is chiefly used in affections of the lower bowels, as *hæmorrhoids*. Externally, it is employed in the form of ointment or baths as a remedy for *scabies*, for which it is also often given internally.

Dose.—Grs. xxx.—ʒiij., according to the effect desired.

Off. Preps.—*Unguentum Sulphuris. L.* (Sulphur, ℥iij., lard, ℔ss. and a little oil of bergamot.)

Unguentum Sulphuris Compositum. L. (Sulphur, ℔ss., white hellebore root, ℥ij., nitrate of potash, ʒij., soft soap, ℔ss. lard, ℔jss., and a little oil of bergamot.)

[*Unguentum Sulphuris Compositum. U. S.* (Sulphur, ℥j., Ammoniated Mercury, Benzoic Acid, *āā* ʒj.; Oil of Lemons, Sulphuric Acid, *āā* fʒj., Nitrate of Potassa, ʒij., Lard, ℔ss.]

IODINIUM. L. D.—Eq.=126·57.

Iodinum. U. S.

Phys. Prop.—A solid, occurring in the form of small scales of a black colour and metallic lustre. *Consistence*, brittle and pulverizable. *Density*, very great, nearly nine times that of water, *Odour*, powerful and irritating. *Taste*, hot and acrid.

Prep.—*Kelp*, prepared by the incineration of Sea-wrack, is lixiviated; and, after the removal of the greater part of its salts by crystallization, the mother liquor contains iodides of sodium and potassium. The potassium or sodium is removed by dis-

tillation with *sulphuric acid* and *peroxide of manganese*, which last is required to supply oxygen for the formation of potash or soda, with which the acid may combine.—The results, then, of the decomposition are, *iodine*, *sulphate of potash*, and *sulphate of manganese;* the former comes over and is condensed. The following formula explains the changes which take place:—

$$KI \text{ and } MnO^2 \text{ and } 2\,SO^3 = KO,\,SO^3 \text{ and } MnO,\,SO^3 \text{ and } I.$$

Chem. Rel.—It is easily volatilized, forming a deep violet-vapour. It is soluble in water, alcohol, and ether. A solution of iodide of potassium is a much better solvent than water alone. It combines with metals to form iodides.—Its *test*, when free, is a cold decoction of *starch*, which forms with it a deep blue compound, iodide of amidine. A solution of an iodide gives a yellow precipitate with *nitrate of silver* and with *acetate of lead*, and a scarlet precipitate with the *persalts of mercury.*

Adulteration.—The chief adulteration of iodine is the presence of a large quantity of *water*, often so considerable as to render the inside of the bottle containing it visibly wet. Other fixed impurities, as *plumbago*, *peroxide of manganese*, *charcoal*, etc., are not so common; and are readily detected by volatilizing a small quantity on the end of a spatula.

Operation.—When taken internally, it is absorbed, and in an exceedingly short time can be detected in the urine and other secretions. It stimulates into activity all the secreting organs, and modifies the function of nutrition. Under its moderate and continued use, chronic tumours disappear, especially those arising from strumous or chronic inflammation, and the disposition to their formation appears to be in some degree checked.—If its use be too long continued, it causes irritation of the mucous membranes; especially of the air-passages and alimentary canal, causing headache, coryza, heartburn, giddiness, and sometimes a state which has been termed *iodism*, characterized by fever, thirst, intense prostration, etc. Sometimes, under its use, the secreting organs themselves become absorbed, as the mammæ and testes. Its effects on nutrition vary much in different individuals; some gaining flesh, while others suffer considerable emaciation.—Externally applied, it acts as a powerful irritant

and vesicant, staining the skin dark yellow.—When administered in large doses, it acts as an irritant on the *primæ viæ*.

Uses.—The class of cases for which iodine has been administered with the greatest success, are *chronic diseases* occurring in scrofulous habits; especially enlargements and indurations of various organs, as in *bronchocele*, for which burnt sponge was previously successfully administered, its beneficial effects appearing to depend on a small quantity of iodine contained in it. It has been used with great success in all the forms of *scrofula*, as scrofulous ophthalmia, diseases of the bones and enlargement of the lymphatic glands; also in *enlargement and induration* of any part from chronic inflammation, as of the liver, spleen, uterus, etc.; also in *nodes*. Its employment has been attended with benefit in *subacute and chronic rheumatism*, especially when the pain is not increased by heat; in *syphilis*, more particularly in the secondary affections arising from that disease; and in *chronic skin diseases*. From its causing increased activity of all the secreting organs, it has been used, combined with other medicines, in almost every disease; as a diuretic, emmenagogue, cholagogue, etc. As an alterative, it has been given to improve the secretion from unhealthy ulcers, and in various *chronic discharges*, as leucorrhœa, etc.

Dose.—Gr. ½ upwards. It is usually given dissolved in a solution of iodide of potassium, or as iodide of starch.

Off. Preps.—*Tinctura Iodinii Comp.* L. (Iodine, ℥j. and iodide of potassium, ʒij. dissolved in rectified spirit, Oij.) Dose.—♏v.—xv.

Unguentum Iodinii Comp. L. (Iodine, ʒss., iodide of potassium, ʒj., a little rectified spirit, ʒj., and lard, ℥ij.)

Sulphuris Iodidum. U. S. *Iodide of Sulphur.*

Phys. Props.—It occurs in the *form* of a black mass, with a radiated appearance like *antimony*. *Odour*, similar to iodine.

Preparation.—It is prepared by gently heating 12 parts of *sulphur* with 88 parts of *iodine*.

Chem. Rel.—Its elements are easily disunited. When heated with water, the iodine is separated and sublimes, and the sulphur remains.

USES.—It has only been used externally as an excitant in some forms of *skin affections*, especially in lupus, acne, etc.

Majendie's Formula for the Ointment.—One part of the iodide of sulphur to eighteen parts of lard.

ARSENICI IODIDUM. *Iodide of Arsenic.*

PHYS. PROP.—It is of a deep red *colour;* and, when sublimed, *forms* beautiful crystalline scales.

PREPARATION.—It is prepared by heating gently together *iodine* and *arsenic.*

CHEM. COMP.—1 eq. of arsenic + 3 eqs. of iodine ($As\ I^3$). It is decomposed when heated with water.

USES.—As an internal remedy and external application in *tubercular skin diseases,* as lupus, etc.

DOSE.—Gr. $\frac{1}{16}$—$\frac{1}{12}$ gradually increased.

LIQUOR HYDRARGYRI ET ARSENICI IODIDI.

Donovan's Solution.

Made by dissolving *arsenic* and *mercury* in water, by the agency of *iodine;* or by dissolving the *iodide of arsenic* and *biniodide of mercury* in water, some alcohol being subsequently added. It occurs as a slightly yellow-coloured liquid: Dr. Kane states it to be colourless when fresh.

CHEM. COMP.—It is supposed, by Dr. Kane, to consist of *iodide of mercury, hydriodic* and *arsenious* acids; but this is denied by Professor Donovan.

A pint of the solution contains about 142 grs. of solid matter; and the proportions of the ingredients are—*arsenic,* 12·16 grs.; *mercury,* 30·76 grs.; *iodine,* 99·24 grs. It is easily decomposed; and care should be taken, when prescribing, not to unite it with incompatible substances.

OPER. AND USES.—This solution has been used with considerable success in the various forms of *psoriasis, lepra,* papular and scaly *venereal* eruptions, impetigo, porrigo, *lupus,* sycosis, and other forms of *chronic cutaneous disease.*

DOSE.—♏x.—xxx., or more.

BROMINIUM. L. E.—Eq.=78·39.

Brominum. U. S.

Phys. Prop.—A liquid. *Colour*, dark brownish red by reflected, but hyacinth red by transmitted light, when a thin layer is used for the purpose. *Odour*, peculiar, intense, and acrid. *Taste*, acrid.

Prep.—After the crystallization of salt from sea-water the mother liquor is called *bittern*, and contains a bromide of magnesium. This is decomposed by passing a current of *chlorine* through the liquor; a chloride of magnesium is formed, and bromine set free, which, by agitating the liquor with *ether*, is dissolved, and the ethereal solution remains as a layer upon the surface. *Potash* is added to the solution, and a bromide of potassium and bromate of potassa formed, which is all converted into bromide at a red heat. The pure bromine is obtained from the bromide by treating with *sulphuric acid* and *peroxide of manganese*, in the manner described under iodine.

Chem. Rel.—It is volatile, soluble in ether, alcohol, and slightly in water. It unites with the metals, forming bromides; sometimes with great evolution of heat, as in the case of antimony and arsenic. Bromine has the power of bleaching. Its *test* is the production of an orange colour with *starch*.

Oper. and Uses.—Bromine appears to act on the system in the same manner as iodine, but with greater intensity; and it has been given in the same diseases, especially in chronic uterine diseases, and enlargements of the spleen.

ACIDA.

Acidum Sulphuricum. L. E. U. S. *Sulphuric Acid.*

Phys. Prop.—A dense transparent liquid. *Colour*, none, or only slightly brown from impurities. *Consistence*, oily. *Density*, 1·845. *Odour*, none. *Taste*, burning and acid. Acid of this strength passes under the name of oil of vitriol.

Prep.—*Sulphurous acid* from burning sulphur, the fumes of *nitric acid* and *watery vapour* are conveyed into leaden chambers; and the theory of the changes which result in the forma-

tion of sulphuric acid is as follows.—First, a *crystalline compound* is formed by the union of the sulphurous and nitric acids with a portion of watery vapour. When this falls into the water at the bottom of the chamber, it is instantly decomposed. Sulphuric acid is formed, which dissolves in the water, and nitric oxide (NO^2) is given off. This, coming in contact with the air, is converted into peroxide of nitrogen (NO^4), and is then in a state fit to convert fresh portions of the sulphurous acid into the crystalline compound.—When the liquid in the chamber becomes of a specific gravity, about 1·5, it is drawn off and concentrated by heat in vessels of glass or platina. It usually contains some sulphate of lead from the chambers.

The *crystalline compound* has been represented by the formula, SO^2+NO^4+Aqua.

Chem. Comp.—Oil of vitriol is a combination of sulphuric acid with water, in single equivalents, or is a sulphate of water. Anhydrous sulphuric acid consists of 1 eq. of *sulphur*, and 3 eqs. of *oxygen*, and its formula is SO^3. Oil of vitriol has the formula HO,SO^3.

Chem. Rel.—*Reaction*, highly acid, blackening all organic matters with which it comes into contact, and rapidly corroding them. It has a very strong affinity for water, combining with it in definite proportions, with the evolution of definite amounts of caloric.—The *test* is the formation of a white precipitate with *baryta* or its salts, insoluble in nitric acid. Heated with organic matter, copper or mercury, strong sulphuric acid gives off suffocating fumes of sulphurous acid.

Operation.—*Topically*, it is a most powerful caustic, rapidly destroying all the tissues with which it comes in contact; and when swallowed in the concentrated form, acting as an energetic acrid poison. It is only employed *internally in the diluted form*, and then acts as a refrigerant, tonic, and astringent.

Uses.—1. *As a refrigerant*, it is used to allay thirst and febrile excitement in fever, whether typhoid or hectic. 2. Its *astringent* operation is commonly had recourse to in the excessive sweating of phthisical patients, which it is often very successful in restraining, as well as in diminishing the abundance of the expectoration. In some hæmorrhages of a passive character it proves serviceable. 3. *As a tonic*, it is very commonly prescribed in some

forms of dyspepsia, and other diseases of debility, combined with a vegetable bitter.

Dilute sulphuric acid, when taken for some time, causes an increased acidity of the urine, etc.; and hence it can be sometimes used with benefit in certain diseases attended with a neutral or alkaline state of that fluid. Also, in some forms of *chronic skin diseases* not attended with gastro-intestinal irritation, and connected with a low state of system, it is frequently useful, as in pompholix diutinus, lichen, etc.

Off. Prep.—*Acidum Sulphuricum Dilutum.* L. (An ounce and a half by measure of oil of vitriol, diluted with 14½ oz. of distilled water.) Much heat is evolved in the combination, and some sulphate of lead separates as a white powder on cooling: this should not exceed $\frac{1}{400}$th part of the weight of the acid employed.

[*Acidum Sulphuricum Aromaticum, U. S.* Sulphuric Acid, f℥iijss.; Alcohol, Oij.; Ginger, bruised, ℥j.; Cinnamon, bruised, ℥jss. Digest three days and filter.]

Dose.—♏x.—xxx.

Acidum Nitricum. L. U. S. *Nitric Acid.*

Phys. Prop.—A transparent colourless liquid. *Density,* 1·50, but seldom higher in the shops than 1·39. *Odour,* acrid and disagreeable. *Taste,* intensely acid. It is *volatile,* giving off white acid fumes at the ordinary temperature.

Prep.—Equal weights of *nitrate of potash* and *oil of vitriol* are directed to be distilled in a glass retort. The residue is bi-sulphate of potash.—*Theory,* 2 eqs. of sulphate of water, and 1 eq. of nitrate of potash, are engaged in the decomposition: 1 eq. of the sulphate of water, and the 1 eq. of nitrate of potash change bases, *nitrate of water* and *sulphate of potash* being produced; the former distils over, while the latter remains in the retort combined with the other eq. of sulphate of water, as bi-sulphate of potash.

1 eq. Nitrate of Potash	NO^5, KO	Nitrate of Water HO,NO^5
1 eq. Oil of Vitriol	HO, SO^3	Bi-sulphate of Potash HO,SO^3 KO,SO^3
1 eq. Oil of Vitriol HO,SO^3		

Chem. Comp.—It is a nitrate of water. Anhydrous nitric acid is not isolable; it consists of one eq. of *nitrogen* and five eqs. of *oxygen*; and its formula is NO^5. The formula of the strongest aqua fortis is HO,NO^5.

Chem. Rel.—*Reaction*, extremely acid; it corrodes all organic matters, tinging them yellow, from the formation of carbazotic acid. *Tests.*—1. It is decomposed by *copper filings* with the evolution of nitric oxide gas, which is known by its power of giving a dark olive-brown colour to a solution of proto-sulphate of iron. 2. It gives a blood-red colour with *morphia*, *brucia*, and *impure strychnia.*

Adulteration.—Chiefly sulphuric and hydrochloric acids, detected respectively by chloride of barium and nitrate of silver.

Operation.—*Topically*, it acts as a powerful corrosive. When taken *internally*, it is a violent acrid poison, destroying all the tissues with which it comes in contact. It is only administered internally in the diluted form; and then it acts as a refrigerant and tonic.

Uses.—*Topically*, 1. As a *caustic*, it is employed as an application to *phagedenic sores*, and for the destruction of *warts:* the parts surrounding that to be cauterized, should be protected by some cerate from its contact, and the acid applied on sponge, or with a glass rod. 2. In the *diluted* form, it has been used as an application to some ulcers and diseases of the skin. 3. Injected in a very dilute state into the bladder, it has proved very effectual in the solution of *phosphatic calculi.*—*Internally*, it may be given as a refrigerant and tonic in cases similar to those for which sulphuric acid is administered; as in febrile diseases, and for preventing phosphatic deposits; it is also very useful in some forms of *dyspepsia.* But nitric acid seems to possess some power not connected with its acid properties. Thus, in certain *scrofulous* states of the system, and in *syphilis*, occurring in such habits where mercury cannot be given, nitric acid often proves very serviceable. It is also given in some forms of *cutaneous disease.*

Off. Prep.—*Acidum Nitricum Dilutum. L. U. S.* (Nitric acid diluted with nine times its bulk of distilled water.)

Dose.—♏x.—xl.

Acidum Hydrochloricum. L. *Liquid Hydrochloric Acid.*
Acidum Muriaticum. E. U. S.

Phys. Prop.—A colourless transparent liquid. *Density*, 1·16. *Odour*, suffocating. *Taste*, very acrid and sour. It is very *volatile*, and gives off acid fumes.

Prep.—*Chloride of sodium* is directed to be distilled in a glass retort with *sulphuric acid* and *water*, and the hydrochloric acid which passes over, received in a vessel containing some more water.—*Theory*, single equivalents of chloride of sodium and sulphate of water (sulphatoxide of hydrogen H, S O^4) are engaged in the decomposition. The hydrogen and sodium change places, and the result is *chloride of hydrogen*, or hydrochloric acid, and sulphatoxide of sodium, or *sulphate of soda.*

1 eq. Chloride of Sodium . . .	Cl Na	1 eq. Hydrochloric Acid, H Cl.
1 eq. Sulphuric Acid	H S O^4	1 eq. Sulphate of Soda NaO, SO^4, or Na, SO^3

Chem. Comp.—Hydrochloric acid is a compound of 1 eq. of *chlorine* and 1 eq. of *hydrogen*, and is a gas. The officinal acid is its solution in water.

Chem. Rel.—*Reaction*, strongly acid. It dissolves various animal matters when diluted. With metallic oxides it combines, and in doing so is decomposed, a chloride of metal and water being formed. It is decomposed by zinc, iron, etc., with evolution of hydrogen and formation of a chloride. *Tests.*—1. With a few drops of nitric acid it *dissolves gold leaf.* 2. *Nitrate of silver* gives a curdy-white precipitate with it of chloride of silver, which blackens on exposure to light, is insoluble in nitric acid, but soluble in liq. ammoniæ and in hyposulphite of soda, with formation of an intensely sweet solution.

Adulteration.—*Sulphuric acid*, free *chlorine*, and *iron* are commonly present in the commercial acid; the two latter rendering it of a yellow colour.—Sulphuric acid is detected by *chloride of barium;* chlorine, by the acid *dissolving gold leaf* diffused through it: and iron, by the red oxide being thrown down

on saturation of the acid with *ammonia* or its carbonate, or by neutralizing and testing with tannic acid, or a sulphocyanide.

Operation.—Topically it acts as a powerful caustic and acrid poison. Internally it is only taken in a dilute form, and then acts in a manner very similar to nitric acid.

Uses.—It is given as a tonic in some forms of *atonic dyspepsia* (the natural acidity of the gastric juice depends on the presence of this acid); also in *low states of the system*, as in the petechial form of exanthematous diseases. It is also used as a gargle in ulceration of the throat and in diphtheritis.

Off. Prep.—*Acidum Hydrochloricum* (*Muriaticum*) *Dilutum.* (One measure of hydrochloric acid diluted with three measures of distilled water.)

Dose.—♏xv.—xl.

Acetum. L. U. S. *Vinegar.*

Phys. Prop.—A liquid. *Colour*, yellowish. *Odour*, peculiar and agreeable. *Taste*, acid.

Prep.—In this country, it is prepared from various kinds of malt liquors, or from an infusion of malt made for the purpose; and on the Continent, from several varieties of wine. In all cases, the acetous fermentation is excited much in the same way; namely, by free exposure to the action of the air.—*Theory*, alcohol, on exposure to the air, absorbs a certain portion of oxygen, and is partly decomposed; some of its hydrogen is removed as water, by one portion of the oxygen, while another portion combines with the alcohol; the formula expressing the change is $C^4H^6O^2$ and $O^4=C^4H^3O^3$ and $3\,HO$.

Chem. Comp.—Commercial vinegar contains, besides *acetic acid* and *water*, *colouring matter*, *mucilage*, etc.; a little sulphuric acid is allowed to be added, but not more than $\frac{1}{1000}$th part by weight of the whole vinegar.

Adulterations.—These are, an excess of sulphuric acid and various metallic impurities, such as lead, copper, etc. The former is detected, by the precipitate from chloride of barium in a fluid ounce of the vinegar weighing more than 1·4 grs., and the latter by the change of colour with sulphuretted hydrogen.

Oper. and Use.—As the next article—acetic acid.

Off. Prep.—*Acetum Destillatum.* U. S. (A gallon of vinegar is to be distilled in glass apparatus, and 7 pints of it only collected.) It is free from all the impurities of ordinary vinegar.

Acidum Aceticum. L. U. S. *Acetic Acid.*

Phys. Prop.—A colourless liquid. *Density*, 1·048. *Odour*, pungent and agreeable. *Taste*, acrid.

Prep.—*Acetate of soda*, prepared from the liquid products of the destructive distillation of wood, is directed to be *distilled with sulphuric acid and water.*—*Theory*, sulphuric acid takes the place of the acetic in the salt; and the latter being volatile, comes over.

Chem. Comp.—Acetic acid consists of 4 eqs. of *carbon*, 3 eqs. of *hydrogen* and 3 eqs. of *oxygen*, and its *formula*, therefore, is $C^4H^3O^3$. In the officinal acid, this is combined with water.

Chem. Rel.—Acetic acid, when free, is volatile, and has a peculiar odour; it forms salts with bases, most of them very soluble. The acetates of strong bases, as of potassa, soda, lime, etc., when heated, evolve a spirit called acetone (C^3H^3O), and leave a carbonate of the base.

Adulteration.—The *mineral acids*, and various *metallic matters* which may be present in the acid, are detected by their several tests.

Operation.—*Topically*, acetic acid is irritant and rubefacient, and *when swallowed* in the concentrated form, acts as an acrid and caustic poison. In the diluted form it is refrigerant, astringent, and tonic.

Uses.—Much as those of diluted sulphuric acid, being administered internally in similar cases. *Externally*, its caustic properties render it serviceable as an application to warts, and porriginous affections of the scalp. As a rubefacient, it is commonly added to stimulating liniments. Vinegar and water are also employed in preference to simple water for sponging in febrile diseases, and as a cold lotion in inflammatory affections of the head, not so much on account of its superior efficacy, but to inspire confidence and insure its faithful use. It is employed in pharmacy, in the preparation of oxymels and acetates, and as

a solvent for the active principles of cantharides, squill, and colchicum.

Acidum Phosphoricum Dilutum. L. *Diluted Phosphoric Acid.*

Phys. Prop.—A colourless liquid. *Density*, 1·064. *Odour*, none. *Taste*, sour.

Prep.—*Phosphorus* is heated with *diluted nitric acid* in a glass retort, and the acid thus produced is evaporated in a platinum capsule. When cold, it is made of the due strength by addition of distilled water.

Chem. Comp.—Phosphoric acid, in the anhydrous state, consists of 1 eq. of *phosphorus*, and 5 eqs. of *oxygen*. In the ordinary hydrate which is contained in the offic. acid, it is combined with 3 eqs. of water, which act the part of base, so that it is a tri-basic acid, and its *formula* is $3\,H\,O, P\,O^5$.

Chem. Rel.—*Reaction*, acid; it forms salts with metallic oxides, containing in each instance 3 eqs. of base, one or two of which, however, may be water. *Tests.*—1. With *baryta*, it gives a white precipitate, soluble in nitric acid. 2. With *nitrate of silver*, it gives a *yellow* precipitate, soluble in nitric acid and in ammonia.

Adulteration.—*Sulphuric* acid is detected by the precipitate from chloride of barium not being entirely dissolved by nitric acid. *Hydrochloric* acid is detected by the precipitate from nitrate of silver not being entirely dissolved by the same re-agent. *Metallic impurities* are recognised by sulphuretted hydrogen.

Oper and Uses.—As sulphuric, and the other mineral acids.

Dose.—♏x.—f℥ß.

Acidum Hydrocyanicum Dilutum. L. *Diluted Hydrocyanic Acid.*

Acidum Hydrocyanicum. E. U. S.

Phys. Prop.—A colourless liquid. *Odour*, peculiar and diffusive. *Taste*, agreeable.

Prep.—Two modes are prescribed by the London College:—

1. *Ferrocyanide of potassium* ($Fe\,Cy+2\,K\,Cy+3\,H\,O$) is distilled with *sulphuric acid* and *water*, the salt is decomposed by

the acid, and we have formed, hydrocyanic acid (H Cy), which passes over along with water, while a compound salt is left in the retort, consisting of bi-sulphate of potash, and a salt called *yellow salt*, consisting of two eqs. of cyanide of iron, with 1 eq. of cyanide of potassium ($Fe^2Cy^2 + K\,Cy$).

The hydrocyanic acid which passes over, is to be diluted until 100 grains are saturated exactly by 12·7 grains of nitrate of silver.

2. It may also be extemporaneously prepared by agitating in a closed phial 48½ grs. of *cyanide of silver*, with 39½ minims of *diluted hydrochloric acid*, and an ounce of *distilled water*. The cyanogen and chlorine merely take each other's places in the two compounds, *chloride of silver* and *hydrocyanic acid* being produced.

Chem. Comp.—Hydrocyanic acid consists, in its anhydrous condition, of 1 eq. *of cyanogen* ($N\,C^2$), whose symbol is Cy, and 1 eq. *of hydrogen*, and its formula, therefore, is H Cy. In the officinal acid, this is diluted with 50 parts by weight of water. The acid called *Scheele's*, contains about 5 per cent. of anhydrous acid.

Chem. Rel.—*Reaction*, feebly acid: it cannot neutralize the alkaline bases, and neither combines with, nor decomposes their carbonates. It is very *volatile*, the vapour having the odour of the acid. *Tests.*—1. The *odour* is very characteristic, but must not be confounded with that of the oil of bitter almonds. 2. *Nitrate of silver* gives with it a white curdy precipitate, soluble in *boiling* nitric acid. A fluid ounce of the offic. acid should saturate 12·7 grs. of this salt, and the dried precipitate weigh 10 grs. 3. Prussic or hydrocyanic acid, when in contact with potash and protoxide of iron, forms the prussiate of potash, or ferrocyanide of potassium; and if peroxide of iron is present, it is decomposed, with the formation of prussian blue or ferrosesquicyanide of iron: upon this fact depends one of the best tests for the presence of this acid. A solution of the *protosulphate of iron*, containing some persalt (an *old* solution of protosulphate will answer) is added to the suspected fluid, first rendered alkaline by *liquor potassæ*. If hydrocyanic acid is present, prussian blue will be precipitated, mixed with oxides of iron: the latter are to be re-

dissolved by acidulating with *dilute sulphuric acid,* which has no power to dissolve the prussian blue.

Impurity.—A pure solution of hydrocyanic acid is very liable to decompose, especially when exposed to light. This can be, in a great measure, prevented by the addition of a small quantity of a mineral acid, as sulphuric or hydrochloric. When this is the case, the acid acts powerfully on litmus. The sulphuric and hydrochloric acids can be tested for in the usual way, and any foreign acid can be detected by means of a salt called the *hydrargyro-iodo-cyanide of potassium.* This salt is a compound of single eqs. of the iodide of potassium and cyanide of mercury; and in the presence of any acid except the hydrocyanic, becomes *red* from the formation of the iodide of mercury.

Operation.—It acts as a direct sedative to the nerves of the part to which it is applied, whether external or internal. It is quickly absorbed when taken into the stomach, or when applied to any mucous membrane; and it then produces a sedative effect on the whole nervous system, diminishing spasm and pain, should they be present.

Uses.—*Externally*, it is used chiefly to allay the irritation produced by some skin diseases; and also sometimes to relieve pain, as in cancer; but its external use requires considerable caution. *Internally*, it is chiefly used to allay excessive sensibility and irritability of the stomach and intestines, as in *gastrodynia*, *enterodynia* and *vomiting*, combined with antiphlogistic or tonic remedies, as the case may demand. It has also been found useful in relieving spasmodic affections of the respiratory organs, as *whooping-cough*, *spasmodic asthma*, and other *nervous* coughs. In neuralgia, and other diseases of the nervous system, it has not been found of much service; and in *phthisis*, it acts merely as a palliative, relieving the irritating cough which sometimes accompanies this disease.

Dose.—As a lotion f℥ij. may be added to Oss. of distilled or rose water combined with acetate of lead. Great care is necessary if there be abrasion of the surface.

Internally the dose is from ♏ij.—x. in water, almond emulsion, etc.

ACIDUM TARTARICUM. L. U. S. *Tartaric Acid.* Symbol, $\bar{T}$.

PHYS. PROP.—*Form,* crystalline; oblique rhombic prisms. *Taste,* sour.

PREP.—Tartaric Acid is prepared from *bi-tartrate of potash;* and the method employed is first to add *chalk* (carbonate of lime) to the solution of the salt in boiling water; this causes the second ½ eq. of tartaric acid in the bi-tartrate to unite with lime, and we have formed, tartrate of lime (insoluble) and carbonic acid (which escapes), the neutral tartrate of potash remaining in solution; to this, chloride of calcium (equivalent to chalk dissolved in hydrochloric acid) is added, double decomposition takes place, tartrate of lime is again formed, and chloride of potassium remains in solution. The tartrate of lime is then washed repeatedly with distilled water, and afterwards decomposed by means of *dilute sulphuric acid.* An insoluble sulphate of lime is formed, and the tartaric acid being set free, remains in solution, from which it is crystallized by evaporation.

The crystals may be purified by re-solution and crystallization.

Formula for first part of process. $\left\{ \begin{array}{l} (HO,\bar{T}+KO,\bar{T})\text{and } Ca\,O,CO^2 = Ca\,O, \\ \bar{T} \text{ and } KO,\bar{T} \text{ and } HO \text{ and } CO^2 \end{array} \right\}$

Formula for second part . $K\,O,T$ and $Ca, Cl = Ca\,O,T$ and $K\,Cl$

Do. for third part . . . $Ca\,O,T$ and $H\,O,SO^3 = Ca\,O,S\,O^3$ and $\bar{T}$

CHEM. COMP.—Tartaric acid belongs, properly, to the organic department of Materia Medica; but for convenience is introduced in this place. It is composed of $C^8H^4O^{10}$. In the crystalline form it contains two atoms of water, which act as bases, and are replaced in the salts either by two atoms of another base, as K O, etc.; or one atom only is replaced, and the salts are then called bi-salts, as the bi-tartrate of potassa, etc. Hence, this acid is a bi-basic acid.

CHEM. REL.—It forms a very insoluble salt with potassa (the bi-tartrate); but we must have excess of acid present for its production. The tartrates of lead, lime, etc., are also very insoluble.

OPER. AND USE.—It acts in the same manner as the other vegetable acids; viz., as a *refrigerant,* and is used in febrile affections, etc., frequently in the form of effervescing draughts with carbonate of soda. Potash cannot be used in place of soda, on account of the insolubility of the salt produced.

METALLICA.

POTASSIUM—Eq. 39·26.

Potassii Sulphuretum. L. E. U.S. *Sulphuret of Potassium.*

Phys. Prop.—A solid. *Colour*, liver-brown. *Consistence*, brittle. *Odour*, when moist, that of sulphuretted hydrogen. *Taste*, acrid, alkaline, and highly disagreeable.

Prep.—*Sulphur* and *carbonate of potash* are directed to be rubbed together, and then heated in a covered crucible till they have combined.

Chem. Comp.—This compound, formerly called *liver of sulphur*, consists chiefly of the *ter-sulphuret of potassium*, combined with a portion of *sulphate of potash* formed with it in the process for its preparation, and with *carbonate of potash* which is ordered to be used in excess.

Chem. Rel.—*Water* dissolves it, and the solution has the odour of sulphuretted hydrogen. *Acids* generally decompose it, throwing down a large quantity of sulphur. With *acetate of lead*, it produces a precipitate at first red, but afterwards black.

Oper. and Use.—Stimulant. Mostly employed externally in the form of lotions and baths for the cure of itch, psoriasis, etc. In the former disease, it is less efficacious than the *unguentum sulphuris*. Its internal use has been had recourse to in similar cases.

Potassii Iodidum. L. E. U.S. *Iodide of Potassium.*

Phys. Prop.—*Form*, cubic crystals. *Colour*, white, and semi-transparent. *Odour*, slightly that of iodine, from containing a little of that element uncombined. *Taste*, acrid and saline.

Prep.—The Pharmacopœia directs the formation of an *iodide of iron* first, by mixing its elements with water at a moderate heat; then, by adding *carbonate of potash* to the solution, the iodine and carbonic acid exchange bases, *carbonate of iron* and *iodide of potassium* being formed. The solution containing the latter is then strained, and evaporated that the crystals may form.

Another mode of preparing this salt is to add *iodine* to a solu-

tion of *potash;* the following formula then represents the decomposition which takes place; 6KO and I^6=KI^5 and KO, IO^5. The combined salts, viz., the *iodide of potassium*, and the *iodate of potassa*, are then heated to redness. The latter salt is decomposed, and is converted into *iodide of potassium*, with the evolution of oxygen. If the heat has not been sufficient, a little *iodate* remains undecomposed.

Chem. Comp.—The crystals are anhydrous, containing only *potassium* and *iodine* in single equivalents; and their *formula* therefore is KI.

Chem. Rel.—It is very *soluble* in water and alcohol. The iodine gives its characteristic blue colour with *starch*, when liberated from a solution of the salt, by a few drops of sulphuric acid or chlorine. The latter is best applied by mixing the starch with the solution to be tested, and pouring *chlorine gas* from the bottle containing it upon the surface of the liquid: a slight agitation enables the chlorine to act upon the salt in solution, while an excess is avoided. The ordinary tests of *iodine*, by formation of the *insoluble iodides*, are applicable here. For the base, the tests of *potash* may be applied.

Adulteration.—*Water* absorbed by the adulterated salt is sometimes present in considerable quantity, especially where the following adulteration abounds; and is detected by heating it, when the salt will lose weight. *Carbonate of potash* is very generally present, detected by being left on solution of the salt in alcohol, and by the action of it on turmeric or reddened litmus paper. *Chlorides of potassium* and *sodium* are not less common, detected by the precipitate with nitrate of silver being partly dissolved by ammonia. If any *iodate of potash* be present, it is decomposed when in contact with organic bodies, as fat, etc., and hence an ointment made with a salt containing it becomes yellow by keeping.

Oper. and Uses.—The operation of the iodide upon the system, is the same as that of iodine, its local action only being milder, and the salt less likely to disagree with the stomach. Its uses are also similar (see Iodine).

Dose.—Grs. ij.—v. or x. Its dose should for the most part be gradually increased till some beneficial action results.

Off. Prep.—*Liquor Potassii Iodidi Comp.* (Iodine, grs: v. dis-

solved in a watery solution of iodide of potassium, grs. x. to water, Oj. It is analogous to *tinct. iod. comp.* It is a useful form of administering iodine. A grain of iodine and two grains of the iodide are contained in 4 ounces of the fluid. Dose from f℥ij. to f℥vj.

Unguentum Iodini Comp. Iodine, ℈ss.; iodide of potassium, ℈j., alcohol, ℈j., lard, ℥ij. Useful in enlargement of glands.

Potassii Bromidum. L. *Bromide of Potassium.*

Phys. Prop.—*Form*, cubes and rectangular prisms. *Colour*, white and transparent. *Odour*, none. *Taste*, saline and pungent.

Prep.—By mixing *bromide of iron* and *carbonate of potash*, as in the case of iodide of potassium, or by adding *bromine* to caustic *potassa*, the same decompositions take place as in the formation of the iodide.

Chem. Comp.—The crystals are anhydrous, containing only *bromine* and *potassium* in single equivalents; and their formula therefore is KBr.

Chem. Rel.—The *bromine* is indicated by *starch* giving a yellow colour with it, when liberated from the solution of the salt by a few drops of sulphuric acid; the *potassium*, by the ordinary tests of the alkali.

Adulteration.—Alkalies, carbonates, and chlorides are the most common impurities. Sulphates are occasionally present. The *sulphuric acid* is indicated by *chloride of barium.* If *carbonate of potash* be present, the salt has an alkaline reaction. To detect *chloride of sodium or potassium,* the salt is distilled with bi-chromate of potash and oil of vitriol; and what distils over is received into liq. ammoniæ fort. If a chloride be present, the *chromate of chloride of chromium* which comes over colours the solution yellow; but it is unchanged if the salt be pure.

Oper. and Uses.—Similar to those of iodide of potassium (see Bromine).

Dose.—Grs. ij.—x.

Potassii Ferrocyanidum. L. E. *Ferrocyanide of Potassium.*

Potassii Ferrocyanuretum. U. S.

Phys. Prop.—*Form*, large crystals, which are rhombic octo-

hedrons with truncated apices. *Colour*, yellow and transparent. *Consistence*, somewhat flexible. *Taste*, sweetish, bitter, and saline.

Prep.—*Carbonate of potash* is heated with *various animal matters*, as hoofs, horns, etc., in *iron* pots, and the mixture well stirred. When cold, the salt is washed out of the mass with water, filtered, and crystallized. When matters containing nitrogen are brought into contact with potassa and iron at a red heat, this salt is always formed.

Chem. Comp.—Its composition is as if it were composed of one atom of *cyanide of iron* and two atoms of *cyanide of potassium*. In its crystalline state it contains three atoms of water. *Formula*, $Fe\,Cy + K^2Cy^2 + 3\,HO$.

Chem. Rel.—It gives a deep blue precipitate with the *persalts of iron*, and a chocolate brown with *salts of copper*. Zinc and lead are precipitated from their solutions white.

Oper. and Use.—It is not administered; and its only use is in the preparation of hydrocyanic acid. It does not appear to be poisonous.

Liquor Potassæ. L. E. U. S. *Solution of Potash.*

Phys. Prop.—A colourless, limpid, and transparent liquid. *Density*, 1·063. *Odour*, none. *Taste*, acrid and alkaline.

Prep.—*Carbonate of potash* is dissolved in boiling distilled water, and *slaked lime* being added, the whole is shaken together in a closed vessel till cold. The *carbonate of lime* is allowed to subside, and the clear *solution of potash* poured off and preserved in a green glass bottle. It is a better plan to boil the carbonate of potash and lime together. *Theory.*—Hydrate of lime and carbonate of potash, brought together, form *carbonate of lime* and *hydrate of potash*.

Carbonate of potash	KO CO^2	Hydrate of potash $KO+HO$
Hydrate of lime	HO CaO	Carbonate of lime CaO, CO^2.

If there be not sufficient water present, this decomposition will not take place.

Chem. Comp.—It is a solution of potash, which is a compound

of 1 eq. of *potassium*, and 1 eq. of *oxygen*, and the formula is therefore KO.

Chem. Rel.—It possesses *alkaline* properties in a high degree, rendering turmeric brown, and forming soaps with the oils and fats. It decomposes animal tissues, and so gives a soapy feel when rubbed between the fingers. It *precipitates the oxides* from most metallic salts, and has a very powerful affinity for *carbonic acid*. *Tests.*—1. *Tartaric acid* added to it produces a white precipitate (bi-tartrate of potash) first seen on the lines drawn on the glass by the stirrer. 2. *Hyperchloric acid* and *carbazotic acid* produce also precipitates with it. 3. *Chloride of platinum* produces a yellow precipitate of the double chloride of potassium and platinum.

Adulteration.—1. *Carbonic acid* is often present, owing to absorption of it from the atmosphere, either during its preparation or subsequently. It is *detected* by effervescence occurring on addition of a dilute acid. 2. *Sulphuric acid*, if present, is detected by chloride of barium. 3. *Chlorides* are detected by nitrate of silver. 4. *Lime* by oxalate of ammonia. None of these are intentional adulterations.

Operation.—Liquor potassæ undiluted acts as a powerful corrosive and irritant, by rendering soluble the constituents of the animal body. When taken sufficiently diluted, it acts first on the stomach and intestines, neutralizing any free acid that may be present. Hence it is called an antacid. If taken for any length of time, it causes indigestion by destroying the solvent power of the gastric juice. When absorbed it alters the condition of the blood, rendering it darker and less coagulable. It excites the glandular system and secreting organs, increasing the quantity of the secretions and altering their character; hence, it has been called an alterative. Under its use, the urine becomes alkaline, deposits of uric acid or urates are prevented; and, if continued for a long time, the phosphates are thrown down.

Uses.—It is used as an antacid in the forms of *dyspepsia*, accompanied with a large amount of acid secretion; but it should be employed rather to neutralize acid already formed, than with a view to prevent its secretion. In inflammatory affections, especially those accompanied with plastic effusions, as *pericarditis*, *endocarditis*, *pleuritis*, *rheumatism*, etc., it has been recommended

from its power to diminish the coagulability of the blood. It is useful also in the *uric acid diathesis*, and in irritable conditions of the urinary organs; and it has been recommended in some forms of *scrofula*, *syphilis*, *skin diseases*, and glandular enlargements and tumours. It is also given as a diuretic. Externally it is used, when diluted, as a wash.

Dose.—♏x.—xl.

Potassæ Hydras. L. Potassa. U. S. E.

Phys. Prop.—It occurs in the *form* of sticks, of a grayish *colour*, and of a hard and brittle *consistence*.

Prep.—*Solution of Potash* is evaporated in a clean iron vessel over the fire till ebullition no longer occurs, and the fused hydrate is poured into moulds to concrete.

Chem. Comp.—It consists of single eqs. of *potash* and *water*, and its formula is therefore $KO+HO$.

Adulteration.—In addition to the impurities of the liquor potassæ, the hydrate contains commonly *oxide of iron*, *silica*, and often *alumina*. If quite pure, which with the sticks is never the case, it is completely soluble in alcohol.

Oper. and Uses.—A powerful caustic, and employed for the formation of a slough in the surgical treatment of some forms of ulcer, for the opening of abscesses, etc.

Potassæ Carbonas. L. E. U. S. *Carbonate of Potash.*

Phys. Prop.—*Form*, mostly found in small grains. *Colour*, white and opaque. *Taste*, alkaline and caustic.

Prep.—Carbonate of potash is ordered to be prepared from the impure salt called *pearl-ash*, made from the ashes of wood, by dissolving them in water and evaporating to dryness, which yields *potashes;* and these, partly purified and ignited, form pearl-ash. The method of *purifying* this pearl-ash, given in the London Pharmacopœia, is to dissolve in as little water as possible, so as to leave the impurities; strain and evaporate till the solution thickens, and then stir with a spatula till the salt has hardened. A purer salt is ordered to be prepared by heating the

crystallized *bi-carbonate of potash* to redness, which expels one eq. of carbonic acid.

Chem. Comp.—The pure salt consists of *carbonic acid* and *potash* in single equivalents crystallized with two eqs. of water, and its formula is therefore KO, CO^2+2 HO. The carbonate of the shops contains somewhat less water.

Chem. Rel.—*Reaction*, alkaline; *deliquescent*.. *Water* dissolves it freely: it is insoluble in alcohol. *Tests*.—It precipitates *sulphate of magnesia*, producing a white carbonate; and throws down a brickdust-coloured precipitate from solutions of *corrosive sublimate*. It also throws down *insoluble carbonates* from most of the *metallic protosalts*, and the *peroxides* from the *persalts*, such as per-chloride of iron and salts of alumina. The potash is recognised by the tests of that alkali.

Adulteration.—Free *water*, often present, and is *detected* by the loss of weight on drying. *Sulphates* and *chlorides* are respectively detected by chloride of barium and nitrate of silver producing their characteristic precipitates in a solution saturated with nitric acid.

Oper. and Uses.—It is less caustic, but otherwise similar in action and uses to the liq. potassæ.

Dose.—Grs. x.—ʒj.

Off. Prep.—*Liquor Potassæ Carbonatis*. L. U. S. (A solution of carbonate of potash, ℔j. in water, f ʒxii.)

Dose.—♏x.—fʒj.

Potassæ Bi-carbonas. L. E. U. S. *Bi-carbonate of Potash.*

Phys. Prop.—*Form*, large crystals. *Colour*, none, transparent. *Taste*, mildly alkaline.

Prep.—A stream of *carbonic acid gas* is directed to be passed through a solution of *carbonate of potash*. Any crystals that may form are to be dissolved by the application of a gentle heat, and the solution set aside to crystallize.

Chem. Comp.—It consists of 1 eq. of *potash*, 1 eq. of *water*, and 2 eqs. of *carbonic acid*. It is a double salt of carbonate of potash and carbonate of water, and its *formula* KO, CO^2+ HO, CO^2.

Chem. Rel.—The same as carbonate of potash, except that it

does *not* produce any precipitate with *sulphate of magnesia, nor* the brickdust precipitate with *corrosive sublimate* which the carbonate gives rise to.

Adulteration.—The presence of *carbonate* is known by the above-named precipitate with corrosive sublimate; and other impurities are detected as in the carbonate.

Oper. and Uses.—The same as the carbonate. As a remedy for *lithic acid deposits* in the urine (gravel and calculus), it is the most preferable form for administration; its continued use is less likely to disorder the stomach, or to replace lithic by phosphatic deposits. It may be used as a solvent for both lithic acid and phosphatic calculi, with equal advantage.

Dose.—Grs. xv.—ʒß. or ʒj.

Off. Prep.—*Liquor Potassæ Effervescens.* E. (A solution of bi-carbonate, over-saturated with carbonic acid under pressure.)

Potassæ Sulphas. L. E. U. S. *Sulphate of Potash.*

Phys. Prop.—*Form*, six-sided prisms, headed by six-sided pyramids. *Colour*, none, transparent. *Consistence*, very hard. *Odour*, none. *Taste*, bitterish and saline.

Prep.—It is prepared from the *salt which remains from the distillation of nitric acid* (which is rarely a true bi-sulphate, but mostly a mixture of it with neutral sulphate), by heating it in a crucible to expel the excess of acid, and dissolving and crystallizing the sulphate formed.

Chem. Comp.—It consists of single eqs. of sulphuric acid and potash, and the crystals are anhydrous: their *formula*, therefore, is KO, SO^3.

Chem. Rel.—It is not very soluble in *water*. The acid and base are recognised by their respective tests.

Oper. and Uses.—It is mildly laxative and advantageously combined with rhubarb, when administered in some diseases of children. Its hardness adapts it for reducing to powder some vegetable drugs, such as opium, in the preparation of the Pulv. Ipecac. Comp.

Dose.—Grs. x.—ʒj. or ʒiv.

Potassæ Bi-sulphas. L. E. *Bi-sulphate of Potash.*

Phys. Prop.—*Form*, oblique four-sided prisms. *Taste*, very acid.

Prep.—An excess of *sulphuric acid* is directed to be added to the *residue of the distillation of nitric acid*, dissolved in water, and the solution boiled down and crystallized. Bi-sulphate of potash will only crystallize when an excess of acid is present.

Chem. Comp.—Its crystals contain 1 eq. of *potash*, 2 eqs. of *sulphuric acid*, and 2 eqs. of *water*, one of which is basic, and its formula is $H\,O, S\,O^3 + K\,O, S\,O^3 + H\,O$.

Chem. Rel.—*Reaction*, acid, reddening litmus, very soluble in *water*. It decomposes the alkaline carbonates with effervescence.

Oper. and Uses.—Laxative, and fitted for administration where a saline and mineral acid are indicated.

Dose.—Grs. x.—ʒj. or ʒij.

Potassæ Nitras. L. E. U.S. *Nitrate of Potash.*

Phys. Prop.—*Form*, six-sided prisms, terminated by from one to six converging planes, striated. *Colour*, none, transparent. *Taste*, cool, saline, and peculiar.

Prep.—It is imported mostly from the East Indies, where it is prepared by lixiviating *certain soils containing nitrates* together with *wood ashes:* any nitrate of lime present in the soil is decomposed by the carbonate of potash of the wood ashes, and the solution of nitrate of potash passes through the filter, on which the whole is placed, and is subsequently crystallized.

Chem. Comp.—The crystals contain single eqs. of *potash* and *nitric acid*, and are anhydrous, their formula is $K\,O, N\,O^5$.

Chem. Rel.—Fusible when heated, and deflagrates when in contact with carbonaceous matters. The *potash* is detected by its proper tests. To detect the *nitric acid*, dissolve in a little water, add an equal bulk of oil of vitriol, and when cold a little solution of protosulphate of iron, the characteristic dark olive colour will be formed from the presence of the deutoxide of nitrogen.

Adulteration.—The chief impurity is *chloride of potassium*, detected by nitrate of silver.

Operation.—In small doses, it acts as a refrigerant and diuretic, though the latter operation is very uncertain. It appears to diminish the plasticity of the blood in certain inflammatory conditions of the system, when the buffy coat is considerable and there is a disposition to effusion and organization of lymph.

Uses.—1. In subinflammatory states of the stomach and intestines, few internal remedies are more serviceable than the frequent administration of very small doses of this salt considerably diluted. It acts perhaps as a refrigerant. 2. In inflammations generally, when the heat of the skin runs high, it commonly proves effectual in moderating the fever, and, by affecting the state of the blood, is an important remedy in the treatment of rheumatism, pneumonia, pericarditis, etc. 3. In dropsies, it is commonly employed as a diuretic.

Dose.—Grs. iij.—xx. as a refrigerant; ℈ij.—ʒj. as a diuretic.

Potassæ Chloras. L. *Chlorate of Potash.*

Phys. Prop.—*Form*, tabular, 4–6 sided crystals. *Colour*, none. *Taste*, cool, like nitre.

Prep.—A stream of *chlorine gas* is passed through a solution of *carbonate of potash:* after the process is completed, *chlorate of potash* and *chloride of potassium* are formed; the former crystallizes, while the latter remains in solution.

Chem. Comp.—The crystals consist of single equivalents of *potash* and *chloric acid*, and are anhydrous: their formula is, therefore, KO, ClO^5.

Chem. Rel.—It fuses by heat, and is resolved into oxygen and chloride of potassium. It is moderately soluble in water; it readily gives out its oxygen to combustible matter.

Oper. and Uses—It acts as a refrigerant and diuretic; and has been recommended for the purpose of arterializing the blood in *malignant fevers*, etc. It is highly useful in some *sloughing ulcerations* about the mouth and fauces.

Dose.—Grs. x.—xx.

Potassæ Acetas. L. E. U.S. *Acetate of Potash.*

Phys. Prop.—*Form*, foliated satiny masses. *Colour*, white. *Taste*, saline, and rather acrid.

Prep.—It is directed to be prepared by dissolving *carbonate of potash* in *acetic acid* and *water*, and evaporating to dryness.

Chem. Comp.—It consists of single equivalents of *acetic acid* and *potash:* formula, $K\,O, C^4H^3O^3$.

Chem. Rel.—It is easily fused, and highly deliquescent. It is very soluble in *water* and *alcohol.* Sulphuric acid disengages acetic acid vapours.

Adulteration.—The *sulphates* and *chlorides*, if present, are detected by chloride of barium and nitrate of silver as usual.

Oper. and Uses.—In moderate doses, it becomes absorbed, and is converted in the system into carbonate, which, in being excreted by the kidneys, both renders the urine less acid than natural, and in its passage through these organs increases their secretion. In larger doses it is purgative. Its chief employment is as a diuretic in dropsies.

Dose.—As a diuretic, grs. xv.—xxx.; as a purgative, ʒij.—iij.

Potassæ Tartras. L. E. U. S. *Tartrate of Potash.*

Phys. Prop.—*Form*, generally found as a powder, but it ought to be in crystals, which are six-sided prisms with di-hedral summits. *Colour*, none, transparent. *Taste*, bitterish and saline.

Prep.—*Bi-tartrate of potash* is boiled with *carbonate of potash* in water; the potash of the carbonate saturates the excess of acid in the bi-tartrate, converting it into neutral tartrate, while the carbonic acid is given off.

Chem. Comp.—The crystals consist of 1 eq. of *tartaric acid* and 2 of *potash* as base, and their formula, $2\,K\,O, C^8H^4O^{10}$.

Chem. Rel.—It is decomposed by heat into carbonate of potash, water, etc.: exposed to damp air, it absorbs moisture from it. It gives white precipitates with *acetate of lead* and *chloride of barium*, it is soluble in *nitric acid;* the *mineral acids*, when added, taking a portion of the potash, cause the formation of bi-

tartrate in a solution of the salt, which first deposits on the lines drawn by the stirrer on the sides of the vessel.

Adulteration.—The presence of sulphate is detected by chloride of barium causing a precipitate insoluble in nitric acid.

Oper. and Uses.—A mild laxative, and a good adjunct to some of the vegetable cathartics.

Dose.—ʒj.—iv.

Potassæ Bi-tartras. L. E. U. S. *Bi-tartrate of Potash.*

Phys. Prop.—Usually met with in the *form* of a fine crystalline powder. *Colour*, white. *Taste*, acid, and gritty between the teeth.

Prep.—It is prepared from *argol*, the deposit which occurs on the sides of wine casks. This consists in great part of the bi-tartrate of potash, which is *purified* from the other matters by dissolving it in boiling water, and mixing with charcoal and clay, to remove the colouring ingredients; as the liquor cools, crystals are obtained. The term *cream of tartar* is derived from the mode in which the purest kind is obtained, viz., removing the crust which forms on the top of a saturated solution while evaporating.

Chem. Comp.—It contains one eq. of *tartaric* with one eq. of *potash*, and one eq. of *water* as base, tartaric acid being a bi-basic acid, and its formula $HO,KO\,C^8H^4O^{10}$.

Chem. Rel.—*Reaction* of solution, acid. *Water* only slightly dissolves it. A *red heat* converts it into *carbonate of potash.*

Oper. and Uses.—Its solution in water is mildly acid, and forms an agreeable drink in *fevers*, etc. In a large dose, it acts as a powerful but safe hydragogue purgative, producing a similar effect to that obtained from elaterium, but with less general depression. This renders it highly serviceable in dropsical diseases; somewhat smaller doses still act on the bowels, but with less violence, and in still smaller it is diuretic, especially when conjoined with digitalis.

Dose.—As a hydragogue cathartic, ℥ß.—℥j.; aperient, ʒj.—ij.; diuretic, ℈j.—ʒj.

SODIUM.—Eq. 23·31.

Sodii Chloridum. L. U. S. *Common Salt.*

Phys. Prop.—*Form*, cubic crystals. *Taste*, saline.

Prep.—Salt is obtained in this country almost solely from the brine springs of Cheshire, etc., which occur in connexion with beds of rock salt. The brine is evaporated by heat in iron pans, and the impurities removed by skimming; the finest salt is deposited in small crystals in the hottest parts of the pan. These constitute *basket* salt, a name derived from its being commonly sold in baskets, while the coarsest crystals pass under the denomination of *bay salt*. *Sea salt*, which is also sometimes called *bay salt*, is obtained by evaporation of sea water.

Chem. Comp.—It consists of *sodium* and *chlorine* in single equivalents, and its formula is therefore Na Cl.

Chem. Relations.—*Water* dissolves it freely, taking up the same quantity at all temperatures. *Chlorine* is indicated in the salt by the curdy precipitate with the *nitrate of silver;* the *sodium, rather by negative than positive tests*, not producing any precipitate with chloride of platinum, hyperchloric, or tartaric acids, nor with carbonates, phosphates, or sulphuretted hydrogen. The salts of *sodium* tinge flame yellow; *potassa* salts give a purple tinge.

Operation.—Externally applied, as a lotion or bath, it is a *topical stimulant*, imparting this property to sea water, which contains it. Internally it acts as a salutary stimulant to the stomach in the digestion of food; and, if too freely taken as a condiment, is apt to induce thirst. Its stimulant operation on the stomach renders a moderately concentrated solution emetic, and it mostly proves purgative also.

Uses.—It is commonly used with friction as a rubefacient and topical stimulant in chronic enlargements of joints, etc., whether arising from rheumatism or otherwise; and added to the water used in baths or cold sponging, it increases the subsequent reaction. Its emetic action is useful in cases of poisoning with narcotics, when a more energetic emetic is not at hand. Its purgative operation is mostly sought by its administration in an enema. It is a good anthelmintic for children. Its chief use is

as a condiment. It has been stated that abstinence from salt as an article of food has a tendency to induce the presence of worms.

Sodæ Carbonas. L. U. S. *Carbonate of Soda.*

Phys. Prop.—*Form*, large rhombic octohedrons. *Colour*, transparent, or nearly so. *Taste*, alkaline and caustic.

Prep.—The *sodæ carbonas impura*, of the Ph. L. is barilla or kelp; the former being the ash obtained by burning certain species of salsola, the latter that from several varieties of sea-weed. The pure salt is directed to be prepared from this by solution, filtering, and crystallization. The greater part if not all the carbonate of soda in this country, however, is made *from the sulphate*, obtained expressly by the action of sulphuric acid on common salt. This salt is heated with pit coal and chalk, by which it is resolved, first into *sulphuret*, and subsequently into *carbonate*, which is dissolved out; and the solution, being evaporated, is allowed to crystallize.

Chem. Comp.—It consists of single eqs. of soda and carbonic acid, with 10 eqs. of water; and the formula of the crystals is therefore $Na\,O,CO^2+10\,HO$.

Chem. Rel.—It *effloresces* on exposure to the air; when heated its water is all given off. *Water* dissolves it very readily. *Reaction* alkaline; it effervesces with *acids*. Its *carbonic acid* causes it to precipitate the metallic salts.

Oper. and Uses.—Much the same as those of carbonate of potash.

Dose.—Grs. x.—ʒß.

Off. Prep.—*Sodæ Carbonas Exsiccata* (heating the salt till its water of crystallization is expelled, and then powdering it).

Dose.—Grs. v—℈j.

Sodæ Bi-carbonas. L. E. U. S. *Bi-carbonate of Soda.*

Phys. Prop.—A powder. *Colour*, white and opaque. *Taste*, saline, and slightly alkaline.

Prep.—The Pharmacopœia directs that a stream of *carbonic acid* should be poured through a solution of the *carbonate*, and the salt which subsides be pressed in a cloth and gently dried.

Another process, not long ago adopted, is by the mutual decomposition of *common salt*, and the ordinary *carbonate of ammonia* of the shops. *Bi-carbonate of soda* and *sal ammoniac* are formed, and by heating the latter with chalk, the carbonate of ammonia may be recovered.

Chem. Comp.—It consists of 2 eqs. of *carbonic acid*, 1 eq. of *soda*, and one of *basic water*, so that its formula is, HO,CO^2+NaO,CO^2. The London College improperly terms this salt the *sesquicarbonate* of soda.

Chem. Rel.—*Reaction*, feebly alkaline. Its action on the salts of metallic oxides, is similar to that of bi-carbonate of potash. It has also the negative characters of a salt of soda.

Oper. and Uses.—Similar to the bi-carbonate of potash. It is largely employed for making effervescing powders. To saturate a scruple of the bi-carbonate, 18 grs. of tartaric acid, or 17 of citric, or 4 drachms of lemon juice, are required.

Dose.—Grs. x.—ʒj.

Off. Prep.—*Liquor Sodæ Effervescens* (as Liq. Pot. Effer.)

Sodæ Phosphas. L. E. U. S. *Phosphate of Soda.*

Phys. Prop.—*Form*, large crystals, which are oblique rhombic prisms. *Colour*, transparent. *Taste*, cooling, and mildly saline.

Prep.—*Bone Ashes*, consisting in great part of *phosphate of lime*, are decomposed by slightly *diluted sulphuric acid;* and the *phosphoric acid* thus obtained is saturated with *carbonate of soda.* The solution is filtered and allowed to crystallize.

Chem. Comp.—Phosphoric acid is a tri-basic acid, and in this salt, two of its atoms of basic water are replaced by soda, while one is retained to make up the three atoms of base. It contains then, 1 eq. of *phosphoric acid*, 2 eqs. of *soda*, 1 eq. of *water* as base, and 24 eqs. of *water of crystallization;* and its formula is, $2\,NaO, HO.PO^5+24\,HO$.

Chem. Rel.—*Reaction* of solution, slightly alkaline. *Effloresces* on exposure to the air. *Water* dissolves it freely. The solution of the salt gives a white precipitate with the salts of *lead* and *barytes*, which are phosphates of these oxides, and a yellow precipitate with *nitrate of silver;* all soluble in nitric acid. With a salt of *magnesia* and *ammonia*, an insoluble *ammoniaco-magne-*

sian phosphate is formed, similar in its mode of precipitation to bi-tartrate of potash.

Oper. and Uses.—It is a mild saline purgative, and, from its slight taste, well fitted for administration to children. From its power of holding uric acid in solution, it has been lately used in the *uric acid diathesis.*

Dose.—℥iv.—x. as a purgative.

Sodæ Bi-boras. L. *Borax.*
Sodæ Boras. E. U. S.

Phys. Prop.—*Form,* large flattened six-sided prisms. *Colour,* semi-transparent. *Taste,* saline and slightly alkaline.

Prep.—It is now mostly prepared by saturating the *boracic acid* from the lagoons of Tuscany with *carbonate of soda.*

Chem. Comp.—It consists, according to the view of its constitution indicated by its name, of two eqs. of *boracic acid,* one eq. of *soda,* and ten eqs. of *water;* and its formula is accordingly stated to be $Na\,O, 2.BO^3 + 10.HO$.

Chem. Rel.—It *effloresces* slightly on exposure. *Reaction* of solution, alkaline. *Heat* drives off its water, and a stronger heat vitrifies it. *Water* dissolves it pretty freely, but hot much more than cold. The salt is decomposed by sulphuric acid; and the boracic acid thus freed tinges the flame of spirits of wine green.

Oper. and Use.—It is said to be diuretic, and to act on the uterus during labour, much in the same manner as ergot, with which it is not uncommonly conjoined. It forms with honey a good application to the aphthæ of children; and sometimes it is useful in mercurial salivation.

Dose.—ʒß.—ʒj.

Off. Prep.—*Mel Boracis.* (Honey, ℥j., and borax, ʒj.)

Sodæ Potassio Tartras. L. *Rochelle Salt.*
Sodæ et Potassæ Tartras. U. S.

Phys. Prop.—*Form,* halves of crystals, which are prisms of from 6–8 sides. *Colour,* transparent. *Taste,* bitter and saline.

Prep.—This salt is prepared by saturating the tartaric acid of the *bi-tartrate of potash* with *carbonate of soda:* the soda replaces

the basic atom of water in the bi-tartrate, while the carbonic acid is given off.

Chem. Comp.—This salt contains one eq. of *tartaric acid*, with one eq. of *potash*, and one eq. of *soda* as base, and ten atoms of *water* of crystallization: its formula then is KO, Na O. $C^8H^4O^{10}$+ 10 HO.

Chem. Rel.—It *effloresces* slightly on exposure to the air. *Water* dissolves it pretty freely. The strong acids, by removing the soda, produce the precipitate of bi-tartrate of potash. The *potash* and *tartaric acid* are indicated by their respective tests.

Oper. and Uses.—A gentle but efficacious saline laxative, well fitted for administration to gouty and rheumatic patients combined with colchicum, since it becomes converted into carbonate. and thus assists in eliminating the lithic acid by the urine.

Dose.—ʒij.—x.

Sodæ Acetas. L. *Acetate of Soda.*

Phys. Prop.—*Form*, foliaceous masses of interlaced crystals, or in striated needles. *Colour*, none. *Taste*, cooling, saline, and bitterish.

Prep.—It is usually prepared *from the products of the destructive distillation of wood*, part of which is acetic acid. This is formed into an *acetate of lime*, and this salt decomposed by *sulphate of soda; acetate of soda* and *sulphate of lime* resulting.

Chem. Comp.—It consists of single eqs. of *acetic acid* and *soda*, with six eqs. of *water*, and its formula is therefore Na O $C^4H^3O^3$ + 6 HO.

Chem. Rel.—*Water* dissolves it pretty freely. *Sulphuric acid* added, causes it to give out an odour of acetic acid. It yields no precipitate with chloride of platinum.

Oper. and Uses.—Similar to the acetate of potash.

Dose.—℈j.—ʒij.

Sodæ Sulphas. L. E. U. S. *Sulphate of Soda.*

Phys. Prop.—*Form*, oblique rhombic prisms, mostly channelled, and having six sides. *Colour*, transparent. *Taste*, cooling, saline, and bitter.

Prep.—The Pharmacopœia directs that the *salt which remains*

after the formation of hydrochloric acid, should be *dissolved in water*, and as much *carbonate of soda* be added as shall saturate the acid.

Chem. Comp.—It consists of single eqs. of *sulphuric acid* and *soda*, with 10 eqs. of *water*, and its formula, therefore, $Na\,O, S\,O^3 + 10\,H\,O$.

Chem. Rel.—It *effloresces* on exposure to the air. *Water* dissolves it readily. *Reaction*, neutral. It is distinguished by the tests of sulphuric acid and soda.

Oper. and Uses.—It is a purgative, and was formerly used in the same cases as sulphate of magnesia is now.

Dose.—ʒß.—j.

Liquor Sodæ Chlorinatæ. L. U. S. *Solution of Chloride of Soda.*

Phys. Prop.—A colourless liquid. *Odour*, that of chlorine. *Taste*, astringent.

Prep.—Passing *chlorine* gas through a solution of *carbonate of soda.*

Chem. Comp.—The solution contains bi-carbonate of soda, chloride of sodium, and a compound of soda and chlorine of undecided constitution. It has been supposed to be a compound analogous to peroxide of sodium, the two extra atoms of oxygen being replaced by chlorine, and its formula, $Na\,O, Cl^2$.

Chem. Rel.—It first turns *turmeric* brown, and then destroys its colour. *Diluted hydrochloric acid* causes the elimination of chlorine and carbonic acid together. It *decolorizes* sulphate of indigo. With *lime water*, the carbonate is precipitated.

Oper. and Uses.—It acts, when taken internally, as a stimulant and antiseptic, and is administered in cases of poisoning by sulphuretted hydrogen, or hydrocyanic acid, and occasionally in malignant fevers. Most commonly, however, it is used locally, as an antiseptic, for destroying the gangrenous odour of unhealthy wounds and ulcers, and perhaps improving the condition of the part. Mercurial ptyalism is very generally treated by gargles containing this solution.

Dose.—♏xx.—xxx.

Sapo. L. E. U. S. *Soap, Hard and Soft.*

There are two kinds of soap introduced into the Pharma-

copœia; hard soap made with soda (*sapo ex olivæ oleo et soda confectus*), and soft soap, made with potash (*sapo ex olivæ oleo et potassa confectus*).

Phys. Prop.—*Sapo* (hard soap). *Colour*, white or marbled. *Consistence*, hard. *Taste*, slightly alkaline.

Sapo mollis (soft soap). *Colour*, yellowish, transparent. *Consistence*, soft. This is the common soft soap, made with animal oil or fat, none being ever made according to the directions of the Pharmacopœia.

Prep.—*Hard soap* is made by heating together olive oil and caustic soda until they combine. *Soft soap* is stated to be formed from olive oil and caustic potash; but none is to be found answering to this description in the shops.

Chem. Comp.—*Hard soap* is a compound of *soda* with *oleic* and *margaric* acids, forming an oleate and margarate of that alkali.

Chem. Rel.—*Water and alcohol* dissolve soap readily. The acids, earthy and metallic salts, decompose it; the former liberating the fatty acids, the latter forming insoluble earthy or metallic salts with them.

Oper. and Uses.—*Externally* it is used as a detersive in various cutaneous diseases, and is added to liniments of a stimulant and lubricating character. *Internally* it acts in a similar manner to the fixed alkalies, and is used for similar purposes. In Pharmacy it is commonly added to pill-masses, to give them a fit consistence, and favour their solution in the stomach. It is also used in the preparation of cerates and plasters.

Dose.—Grs. v.—xxx.

Off. Prep.—*Linimentum Saponis. L. E.* (Soap, ℥iij.; camphor, ℥j.; and spirit of rosemary, f℥xvj.) *Linimentum Saponis Camph. U.S.* (Soap, ℥iij.; camphor, ℥j.; oil of rosemary, oil of origanum, *āā* f℥j.; alcohol, Oj.) *Ceratum Saponis. L. U.S.* (Soap, ℥x.; wax, ℥xiiß.; oxide of lead, ℥xv.; olive oil, Oj.; and vinegar, *cong.* j.: a subacetate of lead is formed which is united with the other ingredients.) [The U. S. orders sol. subacetate lead, Oij.; soap, ℥vj.; white wax, ℥x.; olive oil, Oj.; boil a mixture of the two first to consistence of honey; evaporate till water is dissipated, add the wax melted with the oil, and mix.] *Emplastrum Saponis. L.* (Soap lead plaster.)

MAGNESIUM.—Eq.=12·69.

Magnesia. L. E. U. S.

Phys. Prop.—*Form*, a powder. *Colour*, white. *Taste*, insipid.

Prep.—It is directed to be prepared from the *carbonate*, by exposing it to *heat*, so as to expel its carbonic acid.

Chem. Comp.—It is an *oxide of magnesium*, and its formula Mg.O.

Chem. Rel.—*Reaction*, when rubbed with a little water on turmeric paper, it is observed to be slightly alkaline. *Water* dissolves scarcely any of it. Its solution in acids is precipitated by *phosphate of soda* and *ammonia*, as an ammoniaco-magnesian phosphate, first on the lines drawn on the glass by the stirrer. Its solutions also are precipitated by alkaline carbonates, but not by bi-carbonates.

Adulteration.—*Carbonate of magnesia*, present from imperfect calcination, is detected by effervescence on addition of hydrochloric acid; *lime*, by this solution, being precipitated by bi-carbonate of potash; *sulphate of magnesia*, by its being precipitated by chloride of barium.

Operation.—It is antacid, and by its forming salts with acids in the stomach and intestines, it proves gently laxative.

Uses.—It is useful in various forms of dyspepsia, where there is great secretion of *acid* by the stomach, serving to neutralize it, and relieving the painful sensations which accompany its presence. It is also highly serviceable in cases where a great excess of lithates is secreted with the urine, and also in gout, where this state of stomach and urine prevails. It is a common addition to purgatives for children. When taken for a long time and in large quantities, it may form intestinal concretions.

Dose.—Grs. x.—ʒj.

Magnesiæ Carbonas. L. E. U. S. *Carbonate of Magnesia.*

Phys. Prop.—*Form*, a light powder. *Colour*, white. *Taste*, none.

Prep.—It is prepared by mixing solutions of *carbonate of soda* and *sulphate of magnesia*, boiling, and then collecting and drying the precipitate.

Chem. Comp.—It is not a true carbonate, but a sub-carbonate of magnesia, containing less than 1 eq. of carbonic acid to 1 eq. of magnesia. It is also hydrated.

Chem. Rel.—*Reaction*, slightly alkaline when moistened and rubbed upon turmeric paper. *Water* dissolves scarcely any of it. *Acids* dissolve it with effervescence; and the magnesia is indicated in the solution by the tests above-mentioned.

Adulteration.—*Carbonate of soda* is indicated by an alkaline reaction of water, with which the carbonate of magnesia has been boiled; *sulphate of magnesia*, by a precipitate with chloride of barium; and *chloride of sodium*, by a precipitate with nitrate of silver. *Lime* is detected by a solution in dilute sulphuric acid giving a precipitate with bi-carbonate of potash.

Oper. and Uses.—Similar to magnesia, but less fitted for administration as an antacid where flatulence prevails, owing to the evolution of carbonic acid.

Dose.—Grs. xv.—ʒj.

Magnesiæ Sulphas. L. E. U. S. *Sulphate of Magnesia.*

Phys. Prop.—*Form*, four-sided prisms, terminated by four-sided pyramids or reversed dihedral summits; usually met with in small acicular crystals. *Colour*, none. *Taste*, saline and bitter.

Prep.—It is prepared either from *bittern*, the mother liquor left after the crystallization of salt from sea water, or else from magnesian limestone—*dolomite*. Bittern contains a *chloride of magnesium* as well as *sulphate*, and to convert the whole into the latter salt, a quantity of *sulphuric acid* is added. *Dolomite* consists of the *carbonates of lime* and *magnesia*, and when dissolved in *dilute sulphuric acid*, an insoluble *sulphate of lime* and a soluble *sulphate of magnesia* result; these are separated, and the magnesian salt crystallized.

Chem. Comp.—It contains single eqs. of *magnesia* and *sulphuric acid*, crystallizing with 7 eqs. of *water*, one of which is more closely combined than the rest, and its formula is $Mg\,O, S\,O^3, H\,O + 6\,H\,O$.

Chem. Rel.—It is slightly *efflorescent* in dry air. *Water* dissolves it freely. The *sulphuric acid* causes it to precipitate the

soluble salts of barytes, and the magnesia is indicated by the tests above mentioned.

Adulteration.—The presence of *chlorides* is detected by the evolution of *hydrochloric acid* on addition of *sulphuric acid*, or by the precipitate with solutions of *nitrate of silver*.

Operation.—It is a commonly used cathartic, producing watery stools, without much griping. It ordinarily increases the secretion of urine also very considerably, especially when the surface is kept cool.

Uses.—In febrile and inflammatory diseases, it is a useful adjunct to the antiphlogistic treatment; and the large quantity of fluid evacuated from the canal renders it highly useful when the liver is congested, or the portal system generally requires depletion.

Dose.—ʒij.—℥j.

BARIUM.—Eq.=68·66.

Barytæ Carbonas. L. E. U.S. *Carbonate of Baryta.*

Phys. Prop.—*Form*, in masses. *Colour*, grayish. *Density*, 4·331.

It Occurs—Native in Lancashire, etc.; constituting the mineral *witherite*.

Chem. Comp.—It consists of single equivalents of *baryta* and *carbonic acid*.

Chem. Rel.—It dissolves in hydrochloric acid with effervescence; vide *Barii Chloridum*.

Purity.—Its most frequent impurities are sulphate of baryta, lime, oxide of iron, copper, and lead. The carbonate should be entirely soluble in dilute hydrochloric acid—*sulphate of baryta* is left undissolved if present. From this solution, *copper* and *iron* would be thrown down by sulphuretted hydrogen and ammonia. To detect *lime*, the solution is to be precipitated by sulphuric acid in excess; and then the sulphate of lime in the solution tested for by carbonate of soda or oxalate of ammonia.

Use.—Its only use is for the preparation of the chloride of barium.

Barii Chloridum. L. U.S. *Chloride of Barium.*

Phys. Prop.—*Form,* flat rectangular plates with bevelled edges. *Colour,* clear and transparent. *Taste,* bitter, saline, and disagreeable.

Prep.—It is directed to be prepared by dissolving the *carbonate* in *diluted hydrochloric acid,* filtering and concentrating the solution that crystals may form.

Chem. Comp.—The crystals consist of single eqs. of *barium* and *chlorine,* with 2 eqs. of *water;* and their formula, therefore, is Ba, Cl+2 H O.

Chem. Rel.—It *effloresces* very slightly in dry air. *Water* dissolves it pretty freely. It is known to be a chloride by the usual precipitate with nitrate of silver. The baryta is known by the dense white precipitate occasioned by sulphuric acid, insoluble in nitric acid.

Adulteration.—As the carbonate.

Oper. and Uses.—In small doses it appears to act as a tonic, stimulating the absorbing system, and causing an increase of most of the secretions. In large doses, it causes considerable irritation of the alimentary canal, and also of the nervous system, evinced by purging, vomiting, convulsions, great weakness of the muscular system, paralysis, etc. If the dose is very large, death results.

It has been chiefly employed in scrofulous affections and skin diseases. It was once used in syphilis, but not found so efficacious as many other remedies.

Off. Prep.—*Liquor Barii Chloridi. L. U.S.* (Chloride of barium, ʒj. dissolved in ℥j. of water.)—*Dose,* ♏ v.—fʒj. [Chloride of barium, ℥j.; water, ℥iij. *U. S.*]

CALCIUM.

Calcii Chloridum. L. U. S. *Chloride of Calcium.*

Phys. Prop.—*Form,* hard crystalline pieces. *Colour,* white, translucent. *Taste,* bitter, acrid and saline.

Prep.—It is formed by dissolving *chalk* in *diluted hydrochloric*

acid, and, when the effervescence is finished, evaporating the salt to dryness, and fusing it. It is then directed to be poured on a clean flat stone, and when cold, broken into small pieces and preserved in a closely-stopped vessel.

Chem. Comp.—It consists of single eqs. of *calcium* and *chlorine*, and in this condition is anhydrous, and its formula Ca,Cl.

Chem. Rel.—It is highly deliquescent, rapidly absorbing moisture from the atmosphere. *Water and rectified spirit* both dissolve it very readily. Its chlorine and calcium are indicated by their ordinary tests (v. Lime).

Oper. and Uses.—It is employed in pharmacy for the rectification of alcohol. Its solution is considered alterative and tonic, and has been used in scrofulous affections and many chronic diseases. It seems to be closely allied to chloride of barium in its action on the system, but less powerful.

Off. Prep.—*Liquor Calcii Chloridi.* *L. U. S.* (Chloride of calcium, ℥iv., dissolved in ℥xij. of water.)

Dose.—♏ xl.—l., gradually increased.

Calx. L. E. U. S. *Lime.*

Phys. Prop.—Of quicklime. *Form*, irregular masses. *Colour*, white or grayish-white. *Taste*, acrid and alkaline.

Prep.—It is directed to be prepared by exposing *chalk* to the *strong heat* of a fire for an hour, in order to drive off its carbonic acid.

Chem. Comp.—It consists of single equivalents of *calcium* and *oxygen*, and its formula, therefore, is Ca O.

Chem. Rel.—*Reaction*, alkaline. It has *a powerful attraction for water;* a small quantity let fall upon a mass of lime, causes it to crack and break down into a white and fine powder, *calcis hydras*, with evolution of much heat. When more water is added, a portion of the lime is dissolved. *Tests.*—Its solution forms insoluble white precipitates with oxalic acid and oxalate of ammonia, also with the carbonates and phosphates.

Adulteration.—The ordinary impurities of consequence, are *carbonate of lime* and *magnesia.* The *former* is detected by effervescence accompanying its solution in dilute hydrochloric

acid, and the *latter* by ammonia producing a precipitate in the hydrochloric solution.

Operation.—Quicklime is caustic, in consequence of its powerful affinity for water.

Uses.—Taken internally as lime water, it acts as an antacid in the same manner as the alkalies and magnesia; but its effects on the system appear to differ from those of the alkalies. It causes deficient secretion from the various organs, whereas the alkalies have an opposite effect. Lime water is used as an antacid in some forms of dyspepsia accompanied by the excessive formation of acid in the stomach; and it has been used also to correct the uric acid diathesis, and hence as a remedy in some calculous affections; but in these last cases it is much inferior to the alkalies.

Mixed with linseed oil, it forms a soapy compound called *carron oil,* used as an application to burns and scalds.

Off. Prep.—*Liquor Calcis. L. U. S.* (A great excess of lime is to be slaked, water poured on it and shaken with it, and the whole allowed to stand for three hours covered: the solution is to be preserved in well-closed glass bottles with the undissolved lime, and when required for use, the clear liquid is to be taken.) It is a limpid liquid, which, on exposure to the air, soon becomes covered with a fine layer of carbonate upon the surface.

Dose.—f℥ß.—iij.

Linimentum Calcis. U. S. Lime water and linseed oil, equal parts, useful in burns and scalds.

Calcis Carbonas. *Creta, Carbonate of Lime, Chalk, Marmor.*

Phys. Prop.—*Form,* in masses. *Colour,* pure white. *Consistence,* hard or friable. *Taste,* none. The *creta preparata* of the Pharmacopœia is more friable, from its particles being in a state of finer division.

Chem. Comp.—It consists of *carbonic acid* and *lime* in single eqs. when quite pure, but in the impure condition contains magnesia, alumina, and silica.

Chem. Rel.—*Heated* to redness in an open fire, carbonic acid is given off, leaving the lime pure and caustic. *Water* does not dissolve it unless containing free carbonic acid. The addition

of hydrochloric acid gives rise to effervescence, and the lime is detected in the solution so formed by oxalate of ammonia.

Adulteration.—*Silica*, if present, is left on dissolving the chalk in dilute hydrochloric acid. The *alumina* and *magnesia*, by a precipitate being formed in the solution on addition of ammonia.

Oper. and Uses.—Its chief, if not entire, operation, when taken internally, is as an antacid. It is chiefly used in diarrhœa, combined with aromatics or astringents where an over acid state of the secretions of the canal appears the cause of the flux. It is used as an antidote for oxalic and the mineral acids.

Off. Prep.—*Creta Preparata. L. E. U. S.* (The chalk is pulverized finely and shaken with water, and after the coarser particles have subsided, the finer part suspended in the water is collected by itself and dried.)

Dose.—Grs. x.—ʒj.

Confectio Aromatica. L. (Cinnamon, nutmeg, cloves, cardamoms, saffron, prepared chalk, and sugar.)

Dose.—℈j.—ʒj.

Mistura Cretæ. L. (Chalk, ʒß.; sugar, ʒiij.; mixture of acacia, f℥jß.; and cinnamon water, f℥xviij.)

Dose.—f℥j.—ij.

Pulvis Cretæ Compositus. L. (Chalk, ℔ß.; cinnamon, ℥iv.; tormentil, ʒiij.; acacia gum, ℥iij.; and long pepper, ʒß.)

Dose.—Grs. x.—ʒß.

Calx Chlorinata. L. E. U. S. *Chloride of Lime.*

Phys. Prop.—*Form*, a powder. *Colour*, white or grayish-white. *Odour*, that of chlorine, but not strong. *Taste*, acrid and bitter.

Prep.—It is prepared by transmitting *chlorine gas* through *hydrate of lime*, loosely scattered in a proper vessel or chamber employed for the purpose.

Chem. Comp.—It contains *lime* combined with a very variable amount of *chlorine*. Like chloride of soda, it probably contains a compound of calcium, analogous to a peroxide, the extra oxygen, however, being replaced by chlorine. It is sometimes called hypochlorite of lime.

Chem. Rel.—Exposed to the air, this compound absorbs mois-

ture and carbonic acid, while chlorine is given off. *Water* dissolves a portion of it. The addition of *hydrochloric acid* causes chlorine to be fully emitted while the solution of the lime takes place. The solution *bleaches* vegetable colours very readily, especially when an acid is added.

Adulteration.—The chief impurity is the presence of carbonate of lime and chloride of calcium, due to exposure, while the amount of chlorine is very much lessened.

Oper. and Uses.—The same as chlorinated soda. The chlorine given off from the solution, on exposure to the air, is the most common mode in which fœtid and infectious effluvia are at present destroyed.

Dose.—Grs. v., in solution.

ALUMINUM.—Eq.=13·72.

Alumen. L. E. U.S. *Alum, sulphate of alumina and potassa.*

Phys. Prop.—*Form*, in octahedral crystals, sometimes in cubes. *Taste*, sour and very astringent.

Prep.—From alum schist, a species of clay containing metallic sulphurets: this is usually calcined and exposed to air and moisture for four or five months. Sulphuric acid is formed, which unites with the alumina, and this is converted into alum by the addition of sulphate of potassa. Or alum may be prepared by acting upon common clay (silicate of alumina) by means of sulphuric acid, and then adding sulphate of potassa, and crystallizing.

Chem. Comp.—Alum is a double salt, consisting of *sulphate of alumina* united with *sulphate of potassa* and *water*. Formula $KO,SO^3+Al^2O^3,3SO^3+24HO$. When heated, it fuses, and swells up; the twenty-four atoms of water leave the salt, and a white spongy mass is left, the *alumen exsiccatum* of the Pharmacopœia. If too much heat is applied, part of the acid is driven off.

Chem. Rel.—Alum effloresces slightly in the air, dissolves in about twenty parts of cold water, and is very soluble in boiling water: the solution has an acid reaction. The *sulphuric acid* and *potassa*, can be detected in the salt by the usual reagents for these bodies, and the *alumina*, by being thrown down as a white

precipitate by alkalies and their carbonates, but only redissolved by excess of the former.

Operation.—Alum acts as a powerful astringent. When externally applied, it produces contraction of the part, which becomes pale; if the solution is very concentrated, and the application continued long, it produces irritation, redness, etc.; when taken internally, it acts at first as an astringent on the mucous membranes, is then absorbed, and supposed to act in a similar manner on the capillary system, and, perhaps, increases the coagulating power of the blood.

It is stated also, that its use renders the urine very acid.

Uses.—Externally it is applied either as an escharotic, or astringent, according to the state of dilution; it has been used to repress hæmorrhage, to destroy exuberant granulations, and to prevent excessive discharges, purulent or otherwise.

Internally it is used in passive forms of hæmorrhage, also in painter's or lead colic; to act as a purgative, and to neutralize any lead in the system. It can also be used in passive discharges, as leucorrhœa, etc.

Dose.—Grs. x.—℈j. as an astringent:—ʒß.—ʒj., as a purgative in colic.

The alumen exsiccatum is used as an escharotic.

Off. Prep.—*Liq. Aluminis Compositus.* L. (Alum, sulphate of zinc, each, ʒj., and water, Oij.) An ounce of the solution contains 8 grs. of each ingredient.

PLUMBUM.—Eq.=103·73.

Plumbi Iodidum. L. E. *Iodide of Lead.*

Phys. Prop.—*Form*, a powder. *Colour*, yellow. *Taste*, none.

Prep.—It is prepared by precipitating a solution of *acetate of lead*, by means of *iodide of potassium*, and washing and drying the precipitate.

Chem. Comp.—It consists of single eqs. of *lead* and *iodine*. Formula, Pb. I.

Chem. Rel.—Heated, it fuses and gives off vapours, which are first of a yellow, and afterwards of a violet colour; the first

consisting of iodide of lead, the second of iodine, leaving a residue of lead. It is dissolved when boiled in water; and the solution, on cooling, deposits the salt in small shining yellow scales.

Oper. and Uses.—Its *modus operandi* is little understood, but it proves useful in the obstinate tumours and ulcerations which occur in strumous constitutions. It is used both externally and internally. It seems to combine both the properties of lead and iodine.

Dose.—Gr. ß.—v.

Off. Prep.—*Unguentum Plumbi Iodidi.* L. (Iodide of lead, ʒj., rubbed up with lard, ℥viij.)

Plumbi Chloridum. L. *Chloride of Lead.*

Phys. Prop.—*Form*, a crystalline powder. *Colour*, white. *Taste*, none.

Preparation.—A hot solution of *acetate of lead* is directed to be precipitated by a solution of *chloride of sodium*, and the precipitate washed and dried.

Chem. Comp.—It consists of single eqs. of *lead* and *chlorine*. (Pb. Cl.)

Chem. Rel.—*Heat* occasions its fusion; and when it cools it forms a semi-transparent horny mass. It is slightly soluble in water, but much more in hot than in cold water. As the hot solution cools, a portion of the salt separates in the form of small tabular or acicular crystals. The solution is blackened by sulphuretted hydrogen, and precipitates nitrate of silver.

Use.—It is used in pharmacy, in the process for hydrochlorate of morphia.

Plumbi Oxydum. L. *Semivitreum, Litharge.*

Phys. Prop.—*Form*, small scales. *Colour* reddish-gray. *Taste*, none.

Prep.—When *lead is melted* and a *stream of air* thrown upon it, the metal is converted into protoxide or *massicot*, taking the form of yellow semi-crystalline scales. When this is fused and allowed to cool, it forms a mass of aggregated scales which constitute *litharge*.

Chem. Comp.—It is a protoxide of lead, consisting of single eqs. of *lead* and *oxygen* (Pb. O).

Chem. Rel.—It is easily *reduced* to the metallic state, by heating with charcoal. It is *soluble in diluted* nitric acid, and the solution is known to contain lead by several tests: solution of *potash*, the *alkaline carbonates*, and *sulphuric acid*, produce white precipitates, which are respectively oxide, carbonate, and sulphate of lead. *Iodide of potassium* throws down the yellow iodide; chromate of potash, a yellow chromate; *sulphuretted hydrogen* renders the solution black, from the formation of the black and insoluble sulphuret.

Use.—In pharmacy for the preparation of emplastrum plumbi, the acetas, and di-acetas plumbi, and the ceratum saponis.

Off. Prep.—*Emplastrum Plumbi. L. U.S.* (Litharge, ℔vj. [℔v. U. S.], olive oil, *cong.* j., and water, Oij., boiled together till they arrive at a proper consistence.) This is a soap of lead.

Unguentum Plumbi Compositum. L. (An acetate of lime is formed by mixing 8 ounces of prepared chalk, with six fluid ounces of distilled vinegar; and this is mixed with three pounds of lead plaster dissolved in a pint of olive oil.)

Plumbi Oxydum Hydratum. L. *Hydrated Oxide of Lead.*

Phys. Prop.—*Form*, a heavy powder. *Colour*, white. *Taste*, none.

Prep.—It is prepared by precipitating the solution of *di-acetate of lead*, by means of *liquor potassæ.*

Chem. Comp.—It consists of 2 eqs. of *oxide of lead* and 1 eq. of *water.*

Chem. Rel.—As the last compound.

Use.—In the process of the Pharmacopœia, for disulphate of quina.

Plumbi Carbonas. L. E. U. S. *Carbonate of Lead.*

Phys. Prop.—*Form*, in powder and friable masses. *Colour*, white. *Taste*, none.

Prep.—Rolls of *sheet lead* are placed over earthen pots containing *acetic acid*, and embedded in *fermenting tan.* In the course of a few weeks, the lead is found more or less entirely

converted into carbonate, according to the thickness of the sheet. The oxygen and carbonic acid are derived from the air and fermenting tan, the acetic acid merely acts by presenting the lead in a fit condition for combining with the carbonic acid.

CHEM. COMP.—It consists of single eqs. of *carbonic acid* and *oxide of lead* ($Pb\,O, CO^2$).

CHEM. REL.—It is insoluble in water, but dissolves with effervescence in diluted nitric acid, and the solution is known to contain lead by the tests before enumerated.

ADULTERATION.—*Sulphate of baryta* is, if present, left undissolved, when the compound is heated with nitric acid. *Chalk* is discovered by dissolving in nitric acid; removing the lead by means of sulphuretted hydrogen, neutralizing, and testing with oxalate of ammonia, when the insoluble oxalate of lime will be precipitated.

OPER. AND USES.—Its action on the system resembles that of the acetate and di-acetate; but it is stated by Dr. Thomson to be much more poisonous. It is never used except as an external application—as a desiccant to excoriated surfaces. Care is necessary when there is much abrasion.

OFF. PREP.—*Unguentum Plumbi Carb. U. S.* (Carbonate of lead, ℥ij., ointment of white wax, ℔j.; useful in burns and excoriations.)

PLUMBI ACETAS. L. E. U. S. *Acetate of Lead.*

PHYS. PROP.—*Form*, a confused mass of interlaced acicular crystals, or in flat four-sided prisms. *Colour*, white. *Odour*, acetous. *Taste*, sweet and astringent.

PREP.—*Litharge* is dissolved by the aid of heat in *diluted acetic acid*, and the solution evaporated and crystallized.

CHEM. COMP.—It consists of single eqs. of *oxide of lead* and *acetic acid*, combined in the salt with 3 eqs. of *water of crystallization*. Its formula is $PbO, C^4H^3O^3 + 3\,HO$.

CHEM. REL.—It *effloresces* slightly on exposure to dry air, combining at the same time with some carbonic acid, with loss of acetic acid. The addition of *sulphuric acid* occasions the evolution of the odour of *acetic acid*. It is freely soluble in water,

and the *lead* is indicated in the solution by tests before-mentioned.

Operation.—The action of the acetate of lead may be taken as the type of that of the salts of lead in general. It is astringent and sedative, lessening excessive discharges, fluxes, and hæmorrhages, and causing diminution of the natural secretions, thus producing constipation, thirst, etc. When long continued, it acts as a general sedative, causing a smaller pulse, diminished temperature, and a species of marasmus. It frequently also acts on the nervous system, causing paralysis, especially of the extensor muscles of the hand, and sometimes coma and apoplexy. Another sedative effect resulting from the long-continued use of lead is a species of colic called lead or painter's colic. These effects are more frequently induced in persons who are much exposed to the influence of lead, than from the internal administration of the acetate.

Uses.—Internally it is one of the most valuable remedies for restraining passive hæmorrhages whatever their source. The combination of opium or digitalis adds to its efficacy, although the former is reputed incompatible with it, in consequence of the decomposition which ensues from the formation of the insoluble meconate of lead. It is very efficacious, also, in chronic diarrhœa, and in diminishing the very copious expectoration in phthisis. It is used externally as a sedative in various forms of cutaneous inflammation, as erysipelas, and the more active varieties of cutaneous disease, in burns, bruises, and sprains. It is also used as an astringent in various affections of the mucous surfaces, as ophthalmia, gleet, etc.

Dose.—Gr. ij.—vj.

Off. Prep.—*Ceratum Plumbi Acetatis. L.* (Acetate of lead, ℈ij.; white wax, ℥ij.; and olive oil, f℥viij.)

Liquor Plumbi Di-acetatis. L. *Solution of Di-acetate of Lead.*

Liquor Plumbi Sub-acetatis. U. S.

Phys. Prop.—A clear liquor. *Colour*, none. *Taste*, sweetish and sub-astringent.

Prep.—It is prepared by boiling a solution of *acetate of lead*

with *litharge*. An additional equivalent of the oxide enters into the constitution of the salt.

Chem. Comp.—It contains an *acetate of lead* in solution, having 2 eqs. of *oxide of lead*, to 1 eq. of *acetic acid*.

Chem. Rel.—*Reaction*, alkaline. It precipitates *gum* from solution, which neutral acetate does not. In other respects it agrees with the acetate.

Oper. and Uses.—It is only employed externally in the same cases as the acetate, to which it is for the most part preferred.

Off. Prep.—*Liquor Plumbi Di-subacetatis Dilutus. L.* (The strong solution very much diluted with the addition of a little spirit, called Goulard water.) *Ceratum Plumbi Compositum. L. Cerat. plumb. subacetatis. U. S.* (Solution of di-acetate of lead, f℥iij., [f℥ijss., U. S.;] wax, ℥iv.; olive oil, Oss. [f℥ix., U. S.,] and a little camphor, ℨss.)

ARGENTUM.—Eq.=108·3.

Phys. Prop.—*Form*, crystallizes in cubes and octahedrons. *Colour*, white and brilliant. *Consistence*, hard but malleable, and very ductile.

Prep.—From the common ore, the *sulphuret of silver*, it is obtained by roasting with *common salt*, the chloride being subsequently decomposed, by causing it to *revolve* in barrels with *water, iron, and mercury*. Chloride of iron is formed and dissolved, while the liberated silver *combines with the mercury*, and the latter is afterwards separated by *distillation*. Lead, when reduced from galena, contains a considerable amount of silver, which is now separated from it by a process called cupellation.

Chem. Rel.—It is soluble in dilute nitric acid.—*Tests.*—1. *Solution of potash* throws down a brown precipitate of the oxide. 2. Hydrochloric acid or chlorides throw down a curdy white precipitate, which turns black on exposure to the light, and is soluble in ammonia, but not in nitric acid. 3. Phosphate of soda precipitates it yellow. 4. Sulphuretted hydrogen precipitates it black.

Adulteration.—*Lead* is indicated by the white precipitate, from addition of a chloride, not being entirely re-dissolved by

ammonia. *Copper* is shown by a black precipitate being thrown down by sulphuretted hydrogen, in the solution left after precipitation by hydrochloric acid.

USE.—For preparation of the nitrate.

ARGENTI CYANIDUM. L. *Cyanide of Silver.*

ARGENTUM CYANURETUM. U. S.

PHYS. PROP.—*Form*, a heavy powder. *Colour*, white. *Taste*, insipid.

PREP.—It is prepared by precipitating a solution of *nitrate of silver* with *diluted hydrocyanic acid*, washing and drying.

CHEM. COMP.—It consists of *silver* and *cyanogen* in single equivalents.

CHEM. REL.—It is decomposed by heat into metallic silver and cyanogen gas. It is soluble in ammonia, and in boiling, but not cold nitric acid. It is decomposed with formation of hydrocyanic acid, by hydrochloric acid, or sulphuretted hydrogen.

USE.—For the extemporaneous preparation of the acidum hydrocyanicum dilutum.

ARGENTI NITRAS. L. E. U. S. *Nitrate of Silver.*

PHYS. PROP.—*Form*, in right-rhombic prisms, or fused in cylindrical sticks for convenience of use. *Colour*, grayish. *Fracture*, exhibits a radiated structure. *Taste*, metallic, bitter, and caustic.

PREP.—*Silver* (which should be previously granulated) is dissolved in *diluted nitric acid* by a sand-bath heat, which is then raised till all the water is driven off, when the *fused* salt is poured into proper *moulds*, and allowed to become solid.

CHEM. COMP.—It consists of single eqs. of *oxide of silver* and *nitric acid*; formula, $Ag\,O, N\,O^5$.

CHEM. REL.—It *blackens on exposure* to the light. At a high temperature, it is decomposed with evolution of *nitrous fumes*. The silver is indicated in the manner before-mentioned (see Argentum).

Adulteration.—The presence of *lead* and *copper* is indicated in the manner described (see Argentum). *Nitrate of potash* is a common impurity, against which the London College makes no provision.

Operation.—Applied externally, it acts as an escharotic, vesicant, stimulant, or astringent, according to its degree of concentration.

Uses.—1. It acts as a caustic, by entering into chemical combination with the tissues, and thus destroying their vitality. Its application produces a white mark, caused by the coagulation of the albumen, which gradually becomes black. For this purpose, it is used in the solid form, or in a concentrated solution; and is applied to venereal ulcers, around parts affected with erysipelas, to poisoned wounds, enlarged tonsils, small-pox, and other pustules in certain affections of the skin, as porrigo; in some cases of stricture of the urethra, and to destroy abnormal growths.

2. As a vesicant, it is used where the speedy production of a blister is desired.

3. As a slight stimulant or astringent, it is applied as a lotion in ophthalmia, gonorrhœa, leucorrhœa, and to various inflammatory affections of other parts requiring the use of astringents.

Internally, it is used as a tonic in various nervous affections, as chorea and epilepsy. It has also been used in various chronic affections of the stomach, especially where the sensibility is morbidly increased, as in gastrodynia, pyrosis, and chronic vomiting.

Its long-continued use is sometimes followed by a permanent blue stain of the skin, which it has been proposed by Dr. Thomson to prevent by the exhibition of nitric acid with it. This effect has never been produced by less than three months' employment of the remedy.

Dose.—Internally, gr. $\frac{1}{6}$ gradually increased. Strength of solution to produce its various effects externally, from gr. $\frac{1}{4}$ to ʒß to an ounce of distilled water.

Off. Prep.—*Liq. Argenti Nitratis.* L. (Nitrate of silver, ʒj., distilled water, ℥j.) Used only as a test.

CUPRUM.—Eq.=31·72.

Cupri Sulphas. L. E. U. S. *Sulphate of Copper.*

Phys. Prop.—*Form*, oblique rhombic crystals. *Colour*, azure blue. *Taste*, styptic and metallic.

Prep.—*Copper pyrites*, or sulphuret of copper, are roasted, so as to form the sulphate by oxidation, which is dissolved out and evaporated, that it may crystallize.

Chem. Comp.—It contains 1 eq. of *protoxide of copper*, and 1 eq. of *sulphuric acid*, with 5 eqs. of *water of crystallization*, one of which is more strongly combined than the rest. Its formula is, $Cu\,O, S\,O^3, H\,O+4\,H\,O$.

Chem. Rel.—It *effloresces* in dry air. *Reaction*, acid. It is pretty soluble in *water*. *Tests*—the sulphuric acid is thrown down by *chloride of barium*. Copper is indicated by *sulphuretted hydrogen* occasioning a brownish-black precipitate; *liquor potassæ*, a bluish-green precipitate; *ammonia*, a purple-blue precipitate redissolved by an excess of the precipitant.

Operation.—Externally, applied to an ulcerated surface, it acts as a stimulant, and in some degree as an escharotic. Its solution is topically stimulant, and astringent on mucous surfaces. Internally, administered in small doses, it proves astringent and tonic; in larger ones, emetic.

Uses.—Topically, it is used in the solid form to repress excessive granulations on ulcers, and its solution to diminish the discharge from the conjunctival membrane in some forms of ophthalmia. Internally, as a tonic, it has chiefly been applied to the cure of epilepsy and chorea: as an astringent, it is commonly used in chronic dysentery and diarrhœa; and as an emetic in cases of narcotic poisoning, or where a speedy action is required.

Dose.—As an astringent and tonic, grs. $\frac{1}{4}$—j. or ij.; as an emetic, grs. iij.—viij.

Cupri Ammonio-Sulphas. L. *Ammonio-Sulphate of Copper.*

Cuprum Ammoniatum. U. S.

Phys. Prop.—*Form*, four-sided prisms. *Colour*, deep blue. *Odour*, that of ammonia. *Taste*, styptic, metallic, and coppery.

PREP.—It is directed to be prepared by rubbing together *sulphate of copper* and *sesquicarbonate of ammonia*, till effervescence has ceased. The mass becomes moist, from the water of crystallization being separated, and the effervescence is due to disengagement of carbonic acid from the sesquicarbonate of ammonia.

CHEM. COMP.—This compound is the common sulphate of copper, with 4 ats. of its water of crystallization expelled, and in their place 2 ats. of ammonia, whose constitution, as an amide of hydrogen (H, N H^2), is analogous to that of water (H O). The formula of the salt, which may be compared with that of the preceding, is Cu O, S O^3, H O+2 N H^3.

CHEM. REL.—*Reaction*, alkaline. Its solution gives a green precipitate with *arsenious acid*. Boiled with *liq. potassæ*, ammonia is liberated, and the salt further decomposed with formation of the oxide of copper, while the sulphuric acid combines with the potash.

OPER. AND USE.—As the sulphate, but more stimulant.

DOSE.—Gr. ½—iij.

OFF. PREP.—*Liquor Cupri Ammonio-Sulphatis. L.* (Ammonio-sulphate of copper, ʒj., dissolved in distilled water, ℥j.) If the salt has lost any of its ammonia previous to the solution being made, it will let fall some sub-sulphate of copper. It is intended as a local application for the same purposes as a solution of the sulphate.

ÆRUGO. L. *Verdigris.*

CUPRI SUBACETAS. U. S.

PHYS. PROP.—*Form*, in powder, or in masses. *Colour*, bluish-green, or blue. *Odour*, disagreeable and acetous. *Taste*, styptic and coppery.

PREP.—In France, by alternating plates of *copper* with the *fermenting marc of grapes*. In England, by sprinkling *copper plates* with *pyroligneous acid*. The former gives a compound of a blue, the latter of a bluish-green tint.

CHEM. COMP.—It is a sub-acetate of copper, containing 1 eq. of *acetic acid*, 2 eqs. of *copper*, and 6 eqs. of *water;* so that its formula may be stated to be Cu O, ($C^4H^3O^3$), Cu O+6 H O.

Chem. Rel.—*Water* decomposes this salt into two others, one the sesqui-acetate, which dissolves, and the other a tri-basic-acetate, which remains insoluble. It is soluble in *ammonia*, and when digested with *sulphuric acid*, gives out the odour of acetic acid.

Oper. and Uses.—Much as the sulphate. Only used externally.

Off. Prep.—*Linimentum Æruginis. L.* (Verdigris, ℥j. dissolved in vinegar ℥vij., and boiled down to a proper consistence, with ℥xiv. of honey.)

Unguentum Cupri Subacetatis. U. S. Verdigris, ℥j.; simple ointment, ℥xv.

ZINCUM.—Eq.=32·31.

Phys. Prop.—*Form*, of a crystalline texture. *Colour*, bluish-white.

Prep.—The oxide, derived from calcining the *sulphuret* or *carbonate*, is mixed with *carbonaceous matter, and distilled.*

Chem. Rel.—At a temperature little higher than its melting point, zinc burns on exposure to the air, with the formation of a white oxide. Diluted sulphuric, or hydrochloric acid, acts upon it with evolution of hydrogen gas, and formation of the sulphate of chloride.—*Tests.—Ammoniæ and liq. potassæ* throw down from its solutions a white hydrated oxide, soluble in an excess of the precipitant. The *alkaline carbonates* throw down a white carbonate. *Ferrocyanide of potassium* gives a white precipitate. An *alkaline sulphuret* produces a white hydrated sulphuret as a precipitate.

Use.—For the preparation of the sulphate.

Zinci Oxydum. L. U.S. *Oxide of Zinc.*

Phys. Prop.—*Form*, a powder. *Colour*, white. *Taste*, none.

Prep.—It is directed to be prepared by precipitating a solution of the *sulphate of zinc* by means of *sesquicarbonate of ammonia*, washing the carbonate thrown down, and removing any adhering alkali by exposure to a red heat.

Chem. Comp.—It consists of single eqs. of *zinc* and *oxygen*, and its formula is Zn, O.

Chem. Rel.—At a red heat it becomes of a lemon-yellow colour, which changes again to white, on cooling. It dissolves in dilute sulphuric acid, and gives the ordinary indications of zinc in solution.

Oper. and Uses.—It is tonic and astringent; its chief internal use is in chorea and epilepsy, connected with a debilitated condition of the system; other spasmodic diseases, however, have been benefited by its use. Externally it is employed in powder or ointment as a desiccant to ulcerated or excoriated surfaces.

Dose.—Grs. ij. increased to x.

Off. Prep.—*Unguentum Zinci. L. E. U. S.* (Oxide of zinc, ℈j.; rubbed with lard, ℥vj.)

Calamina. L. *Calamine.*

Zinci Carbonas. U. S.

Phys. Prop.—*Form*, in masses. *Colour*, grayish or brownish. The *prepared calamine* is in powder, of a dirty gray colour.

Prep.—Calamine is one of the native ores of zinc. The *calamina preparata* is directed to be prepared, by exposing it to a red heat, and pulverizing it.

Chem. Comp.—It should consist in great part of carbonate of zinc; but almost all found in the shops is merely sulphate of baryta, carbonate of zinc being nearly or quite absent.

Chem. Rel.—It should be almost entirely soluble in sulphuric acid, with some effervescence, unless it has been well burnt; and the solution should give indications of zinc, with the ordinary tests.

Oper. and Uses.—It is employed topically as the oxide, but is almost useless.

Off. Prep.—*Ceratum Calaminæ. L. Ceratum Zinci Carbonatis. U. S.* (Calamine ℥viij.; wax, ℥viij.; and olive oil, f℥xvj. The U. S. P., directs lard, ℔ij., instead of the oil.

Zinci Sulphas. L. E. U. S. *Sulphate of Zinc.*

Phys. Prop.—*Form*, same as sulphate of magnesia. *Colour*, none. *Taste*, metallic or astringent.

Prep.—It is prepared by dissolving fragments of *zinc* in *dilute sulphuric acid*, and evaporating and crystallizing the solution.

Chem. Comp.—It consists of single eqs. of *oxide of zinc* and *sulphuric acid*, with 7 ats. of *water*, combined as in sulphate of magnesia, so that its formula is $Zn\,O, S\,O^3, H\,O + 6\,H\,O$.

Chem. Rel.—It *effloresces* on exposure to the air. *Water* dissolves it pretty freely. The sulphuric acid is indicated by chloride of barium, and the zinc by the ordinary tests.

Operation.—In large doses it is emetic, operating with considerable violence; but rarely, we believe, with any unpleasant consequences. Its emetic is followed mostly by a purgative effect. In smaller doses it is tonic and astringent, the latter action being more decided than with the oxide.

Uses.—Its emetic operation is availed of in cases of *narcotic poisoning*, and by some it is preferred to any other emetic in *phthisis*. In this disease it is very serviceable, when, as sometimes happens, large doses of ipecacuanha will not act. As a tonic, it is reputed useful in some nervous and spasmodic diseases, and in certain allied forms of dyspepsia. The desired effect is often not obtained, unless by gradually increasing the doses. As an astringent, it proves serviceable in chronic discharges from mucous surfaces, as in chronic bronchitis, leucorrhœa, and gleet. Topically, it is used in lotions and collyria, as an astringent.

Does.—Emetic, grs. x.—xx. Tonic and astringent, grs. j.—vj. Externally. Gr. ½ to ℈ij. to the ounce of water.

STANNUM. Eq.=58·92.

Phys. Prop.—*Form*, irregular prisms, like basaltic columns, called grain tin; or, in bars, called block tin. *Colour*, white, with a tinge of yellow. *Consistence*, soft, malleable, when heated emitting a peculiar sound. Sp. gr. 7·28.

Prep.—From tin ore called stream-tin, a peroxide of the metal, reduced by heating with coal.

Chem. Rel.—Tin is but slightly acted on by the air; it is volatile at a high temperature; dissolves in strong hydrochloric acid, with evolution of hydrogen and formation of protochloride of tin. A solution of this salt has great deoxidizing powers, reducing salts of mercury, etc., and becoming converted into a persalt.

Oper. and Uses.—When in powder it has been used as a ver-

mifuge. Some suppose it acts mechanically, others that a portion is dissolved in the stomach and intestines, and so acts as a poison to the entozoa. It is of little use.

Dose.—ʒj.—℥j., in treacle, or any thick substance.

Off. Prep.—*Stanni Pulvis. E. U.S.* Tin melted and stirred while cooling, until reduced to a powder, which is to be sifted.

BISMUTHUM.—Eq.=71·07.

Phys. Prop. *Form*, crystallizes in cubes or octahedrons. *Colour*, reddish-white.

Prep.—It occurs native, and is merely separated from the accompanying rock by fusion.

Chem. Rel.—Burns at a high temperature with formation of oxide. It is soluble in nitric acid with formation of the nitrate; on pouring the solution into water an abundant white precipitate of the sub-nitrate is thrown down.

Use.—For the preparation of the tris-nitrate.

Bismuthi Tris-nitras. L. *Tris-nitrate of Bismuth.*
Bismuthi Subnitras. U. S.

Phys. Prop.—*Form*, a heavy powder. *Colour*, white and pearly. *Taste*, none.

Prep.—*Bismuth* is dissolved in *nitric acid*, and the solution poured into *distilled water;* the precipitate is washed and dried by a gentle heat.

Chem. Comp.—It contains, with 1 eq. of *nitric acid*, 1 eq. of *water*, and 3 eqs. of *oxide of bismuth*. The water in this salt is in the place of base, while the oxide of bismuth, being less strongly basic, occupies the place of water of crystallization in other salts. Its constitution is more clearly seen by its formula, HO,NO^5+3BiO.

Chem. Rel.—It is blackened by *sulphuretted hydrogen*. It is dissolved without effervescence by *nitric acid*. *Heated on charcoal* by a blowpipe flame, it loses its acid and oxygen, and is reduced to the metallic state.

Adulteration.—*Carbonate of lead* is an occasional adulteration, and is recognised by effervescing on dissolving it in nitric

acid, and a white precipitate being thrown down by sulphuric acid.

Oper. and Use.—It acts as a sedative and astringent; and is used in certain nervous and irritable states of the stomach, which pass under the name of irritable dyspepsia and pyrosis; the intestinal canal should be previously evacuated by appropriate purgatives.

Dose.—Grs. v.—x., or more.

HYDRARGYRUM.—Eq.=101·43 [or 202·1].*

Phys. Prop.—*Form*, a liquid metal. *Colour*, silver-white with metallic lustre. *Odour and taste*, none.

Prep.—It is usually obtained from *native cinnabar*, its most common ore. This is a sulphuret of the metal, which is reduced by *distillation with lime* in iron retorts. It may, if necessary, be *purified* from foreign metals, by covering it with oil of vitriol, stirring them frequently together for some weeks, and subsequently washing the mercury.

Chem. Rel.—It is slightly volatile at ordinary temperatures, and much more so as the heat is raised. It boils at 662° F., and freezes at —39° F. When scattered, it runs into globules, which are often exceedingly minute. Rubbed for a long time with lard or fats, etc., it undergoes very minute division, so that its globules are no longer visible, even with a good magnifier; and at the same time it becomes partially oxidized. It is soluble in nitric acid and in sulphuric by the aid of heat.—It forms two oxides with acids, both of which combine to form salts: the one a *suboxide*, which is commonly looked upon as a protoxide, and the other a *protoxide*, usually regarded and called a deutoxide. In all that follows under this head, we shall retain the *names given by the London Coll. in the headings*, subsequently treating each compound as considered according to its *true chemical nature*. Mercury dissolves and combines with some metals to form amalgams; with gold this occurs in a very evident manner, the yellow

[* There is a difference of opinion as to the equivalent of mercury. Thomson gives it at 100; Gmelin, 101; Berzelius and Graham, as above, 101·43; Brande, 200; Turner and Phillips, 202·1. This should be borne in mind, as the equivalents and symbols of the preparations given in the text are founded on Graham's views.]

colour of the metal being at once destroyed and a white stain being communicated.

Adulteration.—The impurities of commercial mercury are the presence of lead, tin, zinc, or bismuth. They are detected by the *tailing* of the globules when run along a piece of clean white paper, and by sulphuretted hydrogen occasioning a precipitate in hydrochloric acid which has been boiled upon it.

Operations.—1. Topical, when mercury, in a state of minute division, as in the Unguentum hydrargyri, is rubbed upon the skin, it is partially absorbed, and, entering the circulation, produces the same effects on the general system as when internally administered.

2. General.—Fluid mercury, in its unextinguished state, is never employed now as a remedy, but various preparations contain it in a highly divided state, in which it is well fitted for internal use. Its action, when thus given, is not yet distinctly understood; but the obvious physiological changes which it induces may be enumerated. Its most apparent operation, when administered in small medicinal doses, is to increase the secretions generally; and it has hence acquired reputation as a cholagogue, diuretic, diaphoretic, and emmenagogue; upon which gland or set of glands its action shall be chiefly produced, appears in a great degree to depend upon concomitant circumstances. Its combination with ipecacuanha and opium, for instance, favours its *sudorific property;* with purgatives, its action on the *liver and intestinal glands;* and with squill and digitalis, its operation on the *kidneys.* Under its use in inflammatory diseases, coagulable lymph newly thrown out, as also effusion of serum, often become absorbed, and further effusion is prevented: this effect is very apparent in the case of inflammation of the iris. When its use has been long continued, or when large doses have been given, it occasions an affection of the mouth almost peculiar to itself: the gums become tender, swelled, and red; and there is a great increase of the salivary secretion, at the same time that the glands themselves swell and become painful to the touch; this state may pass off in a few days, or may run on to a further stage. The face generally, or only one side, may become much swollen, the secretion of saliva very excessive, and the smarting of the mouth extreme, the tongue covered with a thick white coat or partially ulcerated,

the jaw unable to be opened, the gums and cheeks covered inside by sloughing ulcers, the teeth drop out, and sometimes portions of the alveolar processes are necrosed. From the earliest to the latest stage of mercurialization, a peculiar fœtor is perceptible in the breath. In some cases, other ill effects arise from the use of mercury: thus we may have the febrile state of the system called mercurial erethism produced, with great prostration of the vital powers. In other circumstances diarrhœa is induced; and in some instances a vesicular eruption appears upon the skin, which is called Eczema mercuriale: various other affections, such as enlargement of glands, ulceration, sloughing, nervous paralysis, and wasting of the body, have been known to follow the use of mercury. In some idiosyncrasies the smallest dose produces these ill effects. Age and the state of the system greatly influence the action of mercury: young children cannot easily be affected by it, nor can adults when labouring under fever and inflammatory affections, and the production of the effect of mercury on the salivary glands is usually accompanied by the amelioration of the disease. Mercury seems also to have a power of altering the composition of the blood, and to be useful in those cases where an excess of fibrine exists in it; it has been long held to have a specific power of destroying the poison of syphilis. Mercury, when taken, becomes absorbed, and can be detected in the various secretions, and also in the solids of the body, as in the bones, in which it has been found in the metallic state. The vapour of mercury, when absorbed, is very apt to produce a peculiar tremor of the muscles, and other ill effects, as is seen in those who make use of it in trade, as gilders, looking-glass makers, etc.

Uses.—In *various internal congestions*, its use is commonly had recourse to for the purpose of increasing the secretions, and thus relieving the vessels of the part, and those of the general system also. *In defective secretions* of bile or urine, it is ordinarily administered in combinatiou with other drugs, which may determine its specific operation. *In fever* it has been given with advantage, apparently operating in the mode above noticed, relieving congestions and increasing secretion, and perhaps altering the constitution of the blood. *In dropsy*, the same operation renders it of great utility, combined, as before stated, with purgatives or diuretics. *In inflammations*, it is an essential element

of the antiphlogistic treatment, and especially serviceable when the accompanying effusion is fibrinous, as occurs in inflammations of serous and parenchymatous tissues. *Rheumatism*, allied to these diseases by the highly fibrinous condition of the blood, is effectively treated by the same medicine. In acute inflammation, the production of a sore mouth by its use is often desirable, the disease not being affected often till this result is obtained; but in the chronic forms, its employment should be much more cautious, the doses small, and the intervals extended. As regards its employment in *syphilis* little need be said, as it has now been fully proved that it is *not essential* for the cure of any of its protean varieties, and the severe salivation formerly had recourse to, not only unnecessary but injurious and cruel. All the good effects of the drug, without its evil consequences, may be obtained by very moderate doses, and with but slight affection of the gums. In some forms, however, not a particle ought to be administered, as when sloughing phagedena occurs, or when the disease is engrafted upon a scrofulous constitution.

Off. Prep.—*Hydrargyrum cum Cretâ. L. E. U. S.* (Mercury, ℥iij., and chalk, ℥v., are directed to be rubbed together till globules are no longer perceptible.) It is a gray powder containing mercury in a finely divided state, and a portion of it probably converted into suboxide. It is a mild mercurial for administration to infants and to young children, and also to adults, when most of the other preparations act too much upon the bowels. Its antacid character fits it for use in cases of diarrhœa with general depraved secretions.

Dose.—Grs. v.—xx. One grain of mercury is contained in $2\frac{2}{3}$ of the preparation.

Pilulæ Hydrargyri. L. E. U. S. (The mass is made by rubbing two parts mercury with three parts confection of roses till the globules are no longer visible, and then adding one part powdered liquorice root.) It is soft and of a dark bluish colour, containing mercury in a finely divided state with some suboxide. It is the form most commonly employed, when it is wished to increase the secretions of the liver, pancreas, and kidneys, especially in the various affections of the alimentary canal.

Dose.—Grs. iij.—x. One grain of mercury is contained in 3 grains of the preparation.

Unguentum Hydrargyri Fortius. L. (Mercury, ℔ij., is rubbed with suet, ℥j., and lard, ℥xxiij., till the globules are no longer visible.) It is of a bluish colour, and probably contains, like the former preparations, both mercury and its suboxide. It is used by way of friction upon the skin, choosing those parts for the inunction where the skin is thinnest, such as the inside of the thighs. It is sometimes rubbed into parts where it is desired that absorption of fluid, etc., shall take place, as into the chest in empyema, etc., also, as an aid to mercurialization by internal remedies, it is often introduced into the axillæ, and left there to melt and be absorbed. One grain of mercury is contained in 2 grains of the ointment.

Unguentum Hydrargyri Mitius. L. (Mercurial ointment rubbed up with twice its weight of lard.) Milder in operation than the last.

Ceratum Hydrargyri Compositum. L. (Mercurial ointment, ℥iv., rubbed up with soap cerate, ℥iv., and camphor, ℥j.)

Linimentum Hydrargyri Compositum. L. (Mercurial ointment, ℥iv., lard, ℥iv., camphor, ℥j., rectified spirit, f℥j., and solution of ammonia, f℥iv.)

Emplastrum Hydrargyri. L. E. U.S. (Mercury, ℥iij., rubbed with a little oil, f℥j., with a small quantity of sulphur, grs. viij., dissolved in it, till globules are no longer visible, and then mixed with melted lead plaster, ℔j.) It contains mercury and sulphuret of mercury.

Emplastrum Ammoniaci cum Hydrargyro. L. (The same as the last, with ammoniacum in place of lead plaster.)

Uses.—These plasters, etc., containing mercury, are employed where we wish to excite the activity of any part, as over chronic tumours, and disease of joints. The linimentum hydrargyri comp., and the emplastrum ammoniaci cum hydrargyro, have their activity increased by the addition of ammonia, camphor, and ammoniacum.

Hydrargyri Iodidum. L. U.S. *Iodide of Mercury.*

Phys. Prop.—*Form*, a powder. *Colour*, greenish-yellow.

Prep.—It is directed to be prepared by rubbing together with a little *alcohol* an *ounce of mercury* with *five drachms of iodine*,

till the globules are no longer visible, and being dried by a gentle heat, to be preserved in a well-closed vessel, excluded from the light.

Chem. Comp.—Though called a protiodide it is really a subiodide, the real equivalent of mercury being half that usually received; namely 101 instead of 202. It contains thus, 2 eqs. of *mercury* combined with 1 eq. of *iodine*, and its formula is H^2I.

Chem. Rel.—It is sublimed, by the cautious application of heat, in red crystals, which soon become yellow, and afterwards black, on exposure to the light. It is not soluble in solution of chloride of sodium, but slightly in solution of iodide of potassium.

Oper. and Uses.—This mild preparation of iodine and mercury is supposed to be admissible and useful in venereal affections combined with a scrofulous constitution, and is a valuable application in the form of ointment to some forms of cutaneous disease.

Dose.—Gr. j., gradually increased.

Off. Prep.—*Pilulæ Hydrargyri Iodidi. L.* (Iodide of mercury, ʒj., mixed up with the confection of dog-rose, ʒiij., and ginger, ʒj.) *Dose*, grs. v. (which contain 1 gr. of the iodide). gradually increased to ℈j.

Unguentum Hydrargyri Iodidi. L. (Iodide of mercury, ℥j., mixed with white wax, ʒij., and lard, ℥vj.)

Hydrargyri Biniodidum. L. E. *Biniodide of Mercury.*

Hydrargyri Iodidum Rubrum. U. S.

Phys. Prop.—*Form*, a powder. *Colour*, scarlet.

Prep.—It is directed to be prepared in the same way as the iodide, only using twice the quantity of *iodine*.

Chem. Comp.—Though named a biniodide, it is to be considered as a *protiodide*, upon the same grounds as were assumed in the case of the preceding preparation. It consists then of single eqs. of *mercury* and *iodine*, and its formula is Hg, I.

Chem. Rel.—By the cautious application of heat, it is sublimed in scales, which are first yellow, but afterwards as they cool become scarlet red. It is soluble in boiling rectified spirit, which

deposits it in crystals as it cools. It is dissolved by solutions of iodide of potassium, bichloride of mercury, and chloride of sodium.

Oper. and Uses.—It possesses, in addition to the ordinary properties of the protiodide, the irritating qualities of the persalts of mercury. As an internal, as well as an external remedy, it is highly useful in the scaly and tubercular forms of skin disease.

Dose.—Gr. $\frac{1}{16}$, gradually increased.

Off. Prep.—*Unguentum Hydrargyri Biniodidi. L.* (Biniodide of mercury, ʒj. mixed with lard, ʒvj., and white wax, ℥ij.)

Hydrargyri Chloridum. L. *Calomel.*

Hydrargyri Chloridum Mite. U. S.

Phys. Prop.—*Form*, a heavy powder. *Colour*, white, or nearly so. *Odour and taste*, none.

Prep.—A *sulphate of mercury*, called a bi-persulphate, is directed to be prepared by boiling together mercury and sulphuric acid, and evaporating the salt thus formed to dryness; this is to be mixed with as much *mercury* as it *already* contains, and then rubbed with *chloride of sodium*, till the globules disappear. It is subsequently to be *sublimed*. *Theory of the process.*—By boiling the prescribed quantities of mercury and sulphuric acid together, a *true* sulphate of mercury is formed, consisting of single eqs. of red oxide of mercury and sulphuric acid, and having a *formula* $Hg\,O, SO^3$, although the Pharmacopœia names this salt a bi-persulphate. By subliming this with chloride of sodium and mercury, the first thing that occurs is the formation of sulphate of soda and chloride of mercury or corrosive sublimate, by a mutual decomposition, while the presence of mercury vapour, by uniting with the chloride, converts it into sub-chloride or calomel. The sublimed mass is directed to be reduced to powder, and well washed and dried, in order to remove any corrosive sublimate which it may contain.

Chem. Comp.—It consists of two eqs. of *mercury* combined with 1 eq. of *chlorine;* and is thus, according to the views we have adopted of the compounds of mercury, not a chloride, but a sub-chloride, and its formula $Hg^2\,Cl$.

Chem. Rel.—*Water* does not dissolve it. *Alkalies* and *lime water* change it to the black sub-oxide. *Nitric Acid*, boiled with it, converts it into corrosive sublimate and pernitrate of mercury.

Adulteration.—*Fixed impurities* are detected by subliming a portion as directed by the Pharmacopœia ; *bi-chloride of mercury* or *sal ammoniac*, by washing it and testing the water with nitrate of silver, lime water, and sulphuretted hydrogen, none of which should occasion a precipitate.

Operation.—Calomel is perhaps more extensively employed than any other mercurial. Being one of the sub-salts of mercury, it does not produce much local irritation. In doses of a few grains, it generally acts as a purgative, increasing the quantity of bile, and the secretions from the intestinal glands and mucous surfaces. In children, it frequently produces a peculiar green appearance of the fæces. In large doses, it has been administered as a sedative in the fevers of warm climates. The constitutional effects of calomel are the same as those of any other mercurial.

Uses.—It is frequently given as a purgative, combined with other cathartics, especially when it is our object to increase the secretion from the intestinal glands, as in liver diseases, icterus, etc. ; also, to produce powerful counter-irritation, as in cerebral affections. It is also frequently given to produce the constitutional effects of mercury described before. Externally, it is used in the form of an ointment in several skin diseases.

Dose.—Gr. j.—xx., or more, according to the effect desired.

Off. Prep.—*Pilulæ Hydrargyri Chloridi Compositæ, L. E.* Plumber's Pill. (Calomel, oxysulphuret of antimony, each, ʒij. ; guaiacum, ℥ss. ; and treacle, ʒij.)

Dose.—Grs. v.—x.

A grain of calomel and a grain of oxysulphuret of antimony are contained in 5 grains of this preparation.

Use.—This preparation is very frequently used when the alterative effect of mercury is required, as in chronic skin affections, and the different forms of secondary *syphilis.*

Pilulæ Catharticæ Compositæ. U. S. Compound extract of colocynth, ℥ss. ; extract of jalap, calomel, each, ʒiij. ; gamboge, ʒij. ; make 180 pills. Each pill contains one grain of calomel. Three are a full dose.

Unguentum Hydrargyri Chloridi. U. S. Calomel, ℨj.; lard, ℥j.; very useful in skin diseases.

Hydrargyri Bi-chloridum. L. *Corrosive Sublimate.*
Hydrargyri Chloridum Corrosivum. U. S.

Phys. Prop.—*Form*, a compact crystalline mass. *Colour*, white and transparent. *Taste*, styptic and acrid.

Prep.—The same quantities of *mercury* and *sulphuric acid* are boiled together as for calomel, and the sulphate thus formed, being mixed with *chloride of sodium*, is *sublimed without* any previous addition of mercury. *Theory.*—On boiling mercury with sulphuric acid, one eq. of sulphuric acid is decomposed, one atom of its oxygen oxidates one atom of mercury, so as to from a *protoxide*, while the remainder of it passes off as *sulphurous acid*. This oxide of mercury forms a *sulphate* with another eq. of sulphuric acid; thus—

1 eq. of Sulphuric Acid	SO^2	SO^2 1 eq. of Sulphurous Acid.
	O	
1 eq. of Mercury	Hg.	Hg. O, SO^3, 1 eq. of Sulphate of Mercury.
1 eq. of Sulphuric Acid	SO^3	

When the sulphate of mercury thus obtained is sublimed with chloride of sodium, a double decomposition occurs, with the formation of *sulphate of soda* and *chloride of mercury.*

1 eq. of Chloride of Sodium .	NA.	Na, SO^4 or NaO,SO^3 Sulphate of Soda.
	Cl.	
1 eq. of Sulphate of Mercury .	SO^4	Hg, Cl. Corrosive Sublimate.
	Hg.	

Chem. Comp.—It consists of single eqs. of *mercury* and *chlorine*, though the London College, by doubling the eq. of mercury, makes it a bi-chloride. Its formula is Hg, Cl.

Chem. Rel.—*Water* dissolves it, but not very freely. *Alcohol and ether* take it up very readily. *Liq. potassæ* or *lime water*

throws down a red precipitate of the oxide. *Carbonate of potash* throws down a brickdust precipitate. *Solution of ammonia* produces a white precipitate of the ammonio-chloride. *Iodide of potassium* gives a yellow precipitate, which gradually becomes scarlet. *Sulphuretted hydrogen* produces the black sulphuret. *Protochloride of tin*, removing chlorine, gives rise to the subchloride in the form of a white precipitate, which soon loses the remainder of its chlorine, leaving metallic mercury in the form of a gray powder. *Decomposition by a current of electricity* is a good test, depositing the mercury reduced upon the surface of gold, with the formation of a white stain of amalgam, which disappears by heat. This is easily done by putting a drop or two of the solution upon a gold coin, and touching the moistened surface with iron: a key answers very well for this purpose.

Operation.—It possesses, in addition to the operation of mercury generally, a considerable amount of irritating action. Externally applied to an ulcerated surface, it acts as a corrosive; and its solution rubbed upon the skin proves highly stimulating. Taken internally in medicinal doses, it proves irritant to the stomach, occasioning often a sense of heat at the epigastrium, or even vomiting and purging.

Uses.—It is commonly used in minute doses as an alterative in some chronic diseases, as secondary syphilis and cutaneous diseases, especially of the scaly kind. It is also used as a local application in some skin diseases, as chronic acne, etc.

Dose.—Gr. $\frac{1}{16}$—$\frac{1}{6}$.

Off. Prep.—*Liquor Hydrargyri Bi-chloridi. L.* (One grain each of bi-chloride of mercury and sal-ammoniac, dissolved in distilled water, Oj.)

Dose.—f℥ss.—ij.

One grain of corrosive sublimate is contained in 2 ounces of the solution.

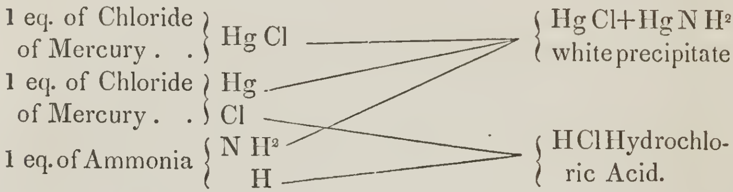
Hydrargyri Ammonio Chloridum. L. *White Precipitate.*

Hydrargyrum Ammoniatum. U. S.

Phys. Prop.—*Form*, a powder. *Colour*, white. *Taste*, metallic.

Prep.—It is prepared by precipitating a solution of *bi-chloride of mercury* by means of *solution of ammonia*, and washing and

drying the precipitate. *Theory.*—Looking upon ammonia as an amide of hydrogen (H, N H^2), the change which occurs is the decomposition of one eq. of chloride of mercury, with the formation of hydrochloric acid and amide of mercury; the latter precipitates with one eq. of chloride, as a double chloride and amide of mercury.



Chem. Comp.—It is a double *chloride of mercury*, and *amide of mercury*, containing single eqs. of each; its formula then, as above stated, is Hg Cl + Hg NH^2.

Chem. Rel.—*Heat* volatilizes and decomposes it. Heated with caustic potash, it acquires a yellow colour, and gives out the odour of ammonia.

Adulterations.—These are *chalk*, *carbonate of lead*, *calomel*, *starch*, and *sulphate of lime*. The two former are detected by effervescence being occasioned by hydrochloric acid; the calomel, by a black colour resulting on addition of lime water; the salt of lead, by a yellow precipitate arising in a solution with acetic acid on addition of iodide of potassium; sulphate of lime, by boiling in distilled water, and testing with baryta and oxalate of ammonia; and starch, by the action of iodine.

Oper. and Uses.—It is only employed externally for the purposes of destroying pediculi, and as a remedy for some cutaneous diseases.

Off. Prep.—*Unguentum Hydrargyri Ammonio-chloridi. L. Ung. Hydrar. ammoniatis, U. S.* (Ammonio-chloride of mercury, ʒj., mixed with melted lard, ℥jss.)

Hydrargyri Bi-cyanidum. L. *Bi-cyanide of Mercury.*

Hydrargyri Cyanuretum. U. S.

Phys. Prop.—*Form*, quadrangular prisms. *Colour*, transparent, or opaque and white. *Taste*, styptic.

Prep.—Two methods are indicated by the London Coll.: 1. *Boiling Prussian blue*, which is called the percyanide of iron, with *red oxide of mercury* in distilled water, and evaporating the filtered solution that it may crystallize. 2. Saturating *hydrocyanic acid*, prepared from the ferrocyanide of potassium and sulphuric acid, with *red oxide of mercury*. *Theory.*—The decomposition is a very simple one, the oxygen and cyanogen merely changing bases, with the formation of *water* and *cyanide of mercury.*

1 eq. of Hydro-cyanic Acid	H Cy	1 eq. Water, HO.
1 eq. of Oxide of Mercury	O Hg	1 eq. Cyanide of Mercury, Hg Cy.

Chem. Comp.—It consists of single eqs. of *mercury* and *cyanogen* (N C^2 or Cy), being analogous to the chloride of mercury, although denominated like it a bi-cyanide.

Chem. Rel.—When heated, it gives off cyanogen gas, leaving globules of metallic mercury. With hydrochloric acid the solution gives off hydrocyanic acid, which is recognised by its odour; and, by depositing on a glass, moistened with nitrate of silver, and held over it, a precipitate soluble in boiling nitric acid.

Oper. and Uses.—Powerfully corrosive, and scarcely ever prescribed. [It has been used with success in syphilis as a substitute for the other mercurials, and as a wash for venereal sores.]

Dose.—$\frac{1}{16}$ to $\frac{1}{2}$ a grain.

Hydrargyri Sulphuretum cum Sulphure. L. *Sulphuret of Mercury, with Sulphur.*

Hydrargyri Sulphuretum Nigrum. U. S.

Phys. Prop.—*Form*, a heavy powder. *Colour*, black. *Taste and odour*, none.

Prep.—Equal weights of *mercury* and *sulphur* are directed to be rubbed together till the globules disappear.

Chem. Comp.—It is believed to consist of the preparation next to be described, with an excess of sulphur.

Chem. Rel.—Heated in an open vessel, it emits vapours of sulphurous acid, and sublimes of a brilliant red colour.

Adulteration.—Charcoal and ivory black are common adul-

terations; and being fixed substances, are left when the compound is exposed to heat so as to volatilize it.

Oper. and Uses.—Of very little value.

Dose.—Grs. v—xxx.

Hydrargyri Bi-sulphuretum. L. *Cinnabar.*

Hydrargyri Sulphuretum Rubrum. U. S.

Phys. Prop.—*Form*, crystalline masses. *Colour*, dark brownish-red. *Consistence*, very friable; and, when powdered, presenting a beautiful scarlet colour.

Prep.—It is prepared by mixing *mercury* with *melted sulphur* over the fire, removing it as soon as the mass begins to swell up, and covering it up closely to prevent the mass from taking fire. When *cold*, the mass is powdered and *sublimed.*

Chem. Comp.—It consists of single eqs. of *mercury* and *sulphur*, being not a bi-sulphuret, but a proto-sulphuret, and analogous in constitution to the red oxide; and its formula being Hg,S.

Chem. Rel.—*Heated* with potash, it is decomposed, and the mercury is sublimed. It is insoluble in water or alcohol, and nitric or hydrochloric acids; but soluble in nitro-hydrochloric acid.

Adulteration.—*Red lead*, *red oxide of iron*, and *brickdust*, if present, are left when the cinnabar is sublimed, as fixed impurities. *Lead*, moreover, may be detected by digestion with acetic acid, and testing the solution with iodide of potassium. *Sulphuret of arsenic* is a less common adulteration; and is detected by boiling in solution of potash, strongly acidulating with hydrochloric acid, and passing a stream of sulphuretted hydrogen through the solution, when the yellow sulphuret will be thrown down.

Oper. and Uses.—It is used for the purpose of fumigation, a mode of using mercury occasionally had recourse to in the treatment of syphilis: ℨß. is sufficient for a single fumigation, when used for ulcerations of the mouth and throat.

Hydrargyri Oxydum. L. *Gray or Black Oxide of Mercury.*

Phys. Prep. *Form*, a powder. *Colour*, dark ash gray. *Taste*, none.

Prep.—It is prepared by shaking *calomel* in *lime water;* and when it has subsided, and the liquor been poured off, washing with distilled water, and drying on blotting paper, in the air. *Theory.*—The mercury and calcium change radicals; and *chloride of calcium* is formed with *suboxide of mercury.*

1 eq. of Lime	Ca O	Ca Cl. 1 eq. of Chloride of Calcium.
1 eq. of Subchloride of Mercury	Cl Hg Hg	Hg^2,O. 1 eq. suboxide of Mercury.

Chem. Comp.—It is not a protoxide, but a suboxide of mercury, and its formula is H^2,O.

Chem. Rel.—Exposed to light, it becomes converted into red oxide and mercury, and assumes an olive colour. Heat decomposes it; oxygen being given off, and mercury sublimed. It is insoluble in water; but soluble in acetic or nitric acid.

Adulteration.—The presence of *red oxide* is discovered by digestion in hydrochloric acid, and precipitating with potash. *Lime* is recognised by a solution in hydrochloric acid being precipitated by oxalate of ammonia.

Oper. and Uses.—It is of little use, unless when prepared in an *extempore* manner for external use, when it passes under the name of the *black wash*, [a very useful application to venereal sores, generally made with calomel, ʒj.; to lime water, Oj.]

Hydrargyri Binoxydum. L. *Red Oxide of Mercury.*

Phys. Prop.—*Form*, a powder. *Colour*, orange-red. *Taste*, acrid and metallic.

Prep.—A solution of *corrosive sublimate* is directed to be precipitated by a *solution of potash*, and the powder washed with distilled water and dried. *Theory.*—The oxygen and chlorine change bases, with formation of *chloride of potassium* and *oxide of mercury.*

1 eq. of Potash	K O	K Cl. 1 eq. of Chloride of Potassium.
1 eq. of Chloride of Mercury	Cl Hg	Hg,O. 1 eq. of Oxide of Mercury.

Chem. Comp.—It consists of single eqs. of *mercury* and *oxygen*, though commonly looked upon as a binoxide, and its formula is Hg,O.

Chem. Rel.—*Heat* decomposes it into oxygen and mercury. It is soluble in hydrochloric acid, with formation of corrosive sublimate.

Adulteration.—The ordinary impurities being of a fixed nature are detected by not subliming by heat; they are *red lead*, *red oxide of iron*, and *brickdust*.

Oper. and Use.—It is chiefly used as an external application to indolent ulceration, etc., as a topical stimulant. A mixture of corrosive sublimate and lime water passes under the name of *yellow wash*.

Hydrargyri Nitrico-Oxydum. L. *Nitric-Oxide of Mercury.*

Hydrargyri Oxidum Rubrum. U. S.

Phys. Prop.—*Form*, crystalline scales. *Colour*, scarlet.

Prep.—A *nitrate of mercury* is formed by dissolving mercury in diluted nitric acid with a gentle heat, and evaporating to dryness. The subsalt, thus formed, is *pulverized and heated*, with formation of oxide and evolution of nitrous fumes.

Chem. Comp. and Use.—The same as the binoxide.

Adulteration.—The presence of *nitric acid* is indicated by the evolution of nitrous fumes on application of heat. *Corrosive sublimate* is indicated by boiling in water, and testing with lime water.

Off. Prep.—*Unguentum Hydrargyri Nitrico-oxydi. L. Ung. Hydrar. Oxidi Rubri. U. S.* Nitric oxide of mercury, ℥j., in fine powder, mixed with ℥ij. of white wax, and ℥vj. of lard. L. [The U. S. orders ℥j. of the oxide to ℥viij. of lard. A very useful application to chronic inflammations of the eyelids, to indolent ulcers, &c.]

Unguentum Hydrargyri Nitratis. L. U. S. *Citrine Ointment.*

A nitrate of mercury is directed to be formed by dissolving an ounce of mercury in eleven fluid drachms of nitric acid, and this is to be mixed with six ounces of lard, and four fluid ounces

of olive oil, melted together. The excess of acid converts the olive oil into *elaïdine*, a saponifiable substance, which the ointment accordingly contains. Citrine ointment, though soft and uniform when fresh, becomes hard and readily falls into a powder when kept. It is a valuable application to porriginous and other cutaneous affections occurring on the scalp; when diluted with six to eight times its weight of ceratum cetacei, it proves highly useful in *ophthalmia tarsi* when smeared upon the eyelids at bedtime, while it prevents the gumming of them, which, in this condition, takes place during sleep. [The U. S. P. orders neat's-foot oil, f℥ix., instead of the olive oil; and ℥iij. lard, instead of ℥vj.]

FERRUM.—Eq.=27·18.

Ramenta. L. Ferri Filum et Ferri Ramenta. U. S.

Phys. Prop.—*Colour*, bluish-gray, and the surface susceptible of being polished. *Odour*, when rubbed, peculiar. *Taste*, styptic. It is *ductile* and *malleable.*

Prep.—The usual ore from which it is obtained, is the *clay-iron stone*, which occurs in this country, in conjunction with coal and limestone. These three products, thus naturally associated, are introduced into a furnace of a peculiar shape, and the iron is obtained in the form of *carburet* or *cast iron.* This is reduced to the state of malleable iron, by burning off the carbon in a reverberatory furnace.

Chem. Rel.—It is soluble in dilute sulphuric acid with evolution by hydrogen and formation of a sulphate. Exposed to damp air, it rusts.

Use.—For the preparation of the iodide and sulphate of iron.

Action of the Compounds of Iron upon the System.

Operation.—Iron forms an important element, entering into the composition of the blood and tissues. The red particles of the blood contain it in the largest quantity, and its presence appears to be of great value in the changes, in which they take a part. When the blood becomes impoverished by any cause, so that the red particles are reduced in number, the state called *anæmia* is produced, which is accompanied by weakness and disordered

function in almost every organ. Palpitations, serous effusions, loss of strength, both of body and mind, headaches, giddiness, disordered digestion, shortness of breath, etc., result as its necessary accompaniments. It is such a condition of the general system that the compounds of iron are most effectual in restoring, whether it follows excessive sanguineous discharges, or other depressing and long-continued evacuations, or is referable to the operation of other debilitating causes. The paleness of the features, the most distinguishing mark of the general disease, gives place to the rosy hue of health, and with the return of strength, of which the colour of the cheeks and lips is the fairest index, the other functional disturbances subside, and depraved and diminished secretions acquire their healthy standard. The long-continued use of chalybeate medicines, however, while exerting in some cases a constipating effect upon the bowels, are apt occasionally to over-stimulate the system. Many of the preparations of iron are also astringent, some much more so than others. Under the use of iron the fæces acquire a black colour.

Use.—In an *anæmic state of the system*, they are especially indicated; removing generally the atonic condition of the functions which is associated with it. *Amenorrhœa* and *nervous diseases*, when resulting from the same state, are properly and most effectually treated with this remedy. The more astringent preparations are of great service in *passive hæmorrhages* and *other discharges* of a similar character.

In some forms of neuralgia, the salts of iron, especially the peroxide, are exceedingly useful.

Ferri Iodidum. L. E. U. S. *Iodide of Iron.*

Phys. Prop.—*Form*, masses of a crystalline or foliated texture. *Colour*, grayish-black, with a metallic appearance. *Taste*, styptic.

Prep.—*Iron filings* and *iodine* are heated together in *distilled water*, so that they may combine and dissolve: when the solution has acquired a greenish colour, it is filtered, and evaporated to dryness in an iron vessel.

Chem. Comp.—This compound consists of single eqs. of *iron* and *iodine* together with *water*, which in the salt found in the shops, is present in variable quantities.

Chem. Rel.—It is highly deliquescent; and when it has absorbed water, or is kept in solution, it readily undergoes decomposition with the formation of sesqui-oxide, and the liberation of iodine. A coil of iron wire introduced into the solution preserves it of uniform strength, since any iodine that may be set free immediately combines with a fresh portion of iron. Sugar added to the solution retards in a great degree this decomposition. When the iodide of iron is heated, free iodine escapes, and sesqui-oxide of iron remains.

Oper. and Uses.—It possesses, in a useful form, the properties both of the ferruginous salts and of iodine, and is indicated in cases where both are required for administration.

Scrofulous and syphilitic cases are thus believed to be benefited by its use, more than by the other preparations of iron. A good vehicle for it is infusion of calumba, the starch combining with any iodine which may be free in the salt.

Dose.—Grs. ij.—x.

Off. Prep.—*Liquor Ferri Iodidi. U. S.* Iodine, ℥ij.; iron filings, ℨj.; honey, f℥v.; water, a sufficient quantity. Mix the iodine with water, ℥x.; add gradually the iron filings. Heat till a light green colour appears, add honey, filter, add water till whole is f℥xx.

Dose.—♏x.—xxx.

Ferri Per-cyanidum. L. *Prussian Blue.*

Ferri Ferro-cyanuretum. U. S.

Phys. Prop.—*Form,* in masses. *Colour,* dark blue, with a bronze tint on the fracture. *Taste and odour,* none.

Prep.—It is precipitated by the addition of a solution of *ferrocyanide of potassium* to one of *persulphate of iron* (sulphate of peroxide of iron).

Chem. Comp.—Prussian blue is a compound of *cyanogen* and *iron,* which are united in the proportion of seven eqs. of iron to nine of cyanogen ($Fe^7 Cy^9$). The mode of combination of the atoms is still doubtful. It is called the ferro-sesqui-cyanide of iron, and may be represented by 3 atoms of the protocyanide of iron, combined with 2 atoms of the sesqui-cyanide.

Chem. Rel.—*Alkalies* decompose it, precipitating peroxide of iron, and producing an alkaline ferrocyanide. Boiled with *red oxide of mercury*, the cyanide of mercury is produced in solution, while an insoluble mixture of oxide and cyanide of iron remains.

Use.—In Pharmacy, for the preparation of the *hydrargyri bi-cyanidum*. It has been given as a tonic in intermittent and neuralgic affections.

Dose.—Grs. v.

Ferri Ammonio-Chloridum. L. *Ammonio-Chloride of Iron.*

Ferrum Ammoniatum. U. S.

Phys. Prop.—*Form*, crystalline grains. *Colour*, yellow or orange. *Taste*, styptic.

Prep.—A *per-chloride of iron* is first formed by dissolving the *sesqui-oxide* in *hydrochloric acid*, *hydrochlorate of ammonia* is then added, the solution filtered and evaporated to dryness. [The U. S. P. directs sub-carbonate of iron, ℥iij.; muriatic acid, f℥x.; muriate of ammonia, ℔ijss.; distilled water, Oiv.]

Chem. Comp.—It contains both *per-chloride of iron* (Fe^2Cl^3), and *hydrochlorate of ammonia*; but it is disputed whether it is a true double salt, or merely a mixture of its constituents. It contains about $\frac{15}{100}$ of sesqui-chloride of iron.

Chem. Rel.—Exposed to the air it deliquesces. *Water* and *alcohol* readily dissolve it. *Potash* added disengages ammonia. The chlorine and iron present are recognised by their usual tests.

Oper. and Uses.—As the compounds of iron generally; but it is little used.

Dose.—Grs. iv.—xij.

Off. Prep.—*Tinctura Ferri Ammonio-chloridi. L.* (Ammonio-chloride of iron, ℥iv., dissolved in proof spirit, Oj.)

Dose.—♏x.—xxx.

[Ferri Oxidum Hydratum. U. S.

Phys. Prop.—*Colour*, reddish-brown. *Taste*, slightly styptic. It occurs as a powder, but for use should be kept in the form of a soft paste.

Prep.—*Sulphate of iron*, ℥iv.; *sulphuric acid*, fℨiijss.; *nitric acid*, fℨvj.; *solution of ammonia*, q. s.; *water*, Oij. The sulphate is dissolved in the water, the sulphuric acid added, and the mixture boiled; the nitric acid is then added very gradually, heating from time to time, until a yellowish-brown colour is produced. Filter, when cold add the ammonia, stirring briskly. The precipitate to be well washed.

Chem. Comp.—This preparation consists of the oxide of iron, water, and a little ammonia.

Chem. Rel.—In this process the sulphate of the protoxide of iron is converted by the action of the two acids into the sulphate of the sesquioxide. When the ammonia is added, the hydrated oxide is precipitated, and sulphate of ammonia remains in solution. The precipitate also contains a little ammonia.

Oper. and Uses.—It is seldom used except as an antidote to arsenious acid, for which purpose it is preferable in a moist state. When added to a solution of arsenious acid, a decomposition ensues that renders the acid insoluble. According to Graham, the mutual reaction gives rise to the formation of the arseniate of the protoxide of iron, $2\ Fe^2 O^3$, and $As^2 O^3 = 4\ Fe\ O + As^2 O^5$. The constitution of the arseniate therefore is $2\ Fe\ O.\ HO,\ As^2 O^5 + 2\ Fe\ O$. To act as an antidote it should be freshly prepared, and be given in large doses, frequently repeated.]

Ferri Sesqui-oxydum. L. *Sesqui-oxide, or Peroxide of Iron.*

Ferri Sub-carbonas. U. S.

Phys. Prop.—It occurs as a powder of a reddish-brown *colour*, and slightly styptic *taste*.

Prep.—*Sulphate of iron* and *carbonate of soda* are separately dissolved in boiling water, and the solutions mixed. The precipitate which occurs is a mixture of carbonate and sesqui-oxide of iron; and, in the course of the washing and drying directed to be performed, the whole becomes converted into sesqui-oxide. That found in the shops is, for the most part, calcined.

Chem. Comp.—It is the highest known oxide of iron, containing 2 eqs. of *iron*, and 3 eqs. of *oxygen* in its constitution. Its formula is Fe^2, O^3.

Chem. Rel.—The sesqui-oxide of iron is soluble in hydrochloric and other strong acids without effervescence; and the solutions of the persalts of iron thus formed are distinguished by exhibiting the following reactions:—With ferrocyanide of potassium, a dark blue precipitate (Prussian blue) is formed. Solutions containing tannic or gallic acids strike a black colour. Meconic acid (or infusion of opium) gives a beautiful red, as also do the sulpho-cyanides, or the saliva which contains them. The latter are distinguished by being decolorized by corrosive sublimate. Alkalies precipitate the red peroxide from solutions of the persalts.

Oper. and Uses.—Those of the compounds of iron generally. From the large quantity which must be given of it at once, it sometimes occasions disorder of the stomach, but this effect is rare.

Dose.—ʒß—iv., mixed with treacle, which obviates its constipating effect.

Off. Prep.—*Emplastrum Ferri. U. S.* Red oxide of iron, ℥viij.; lead plaster, ℔ij.; resin, ℥vj.; yellow wax, olive oil, each, ℥iij.

Pilulæ Ferri Carbonatis. U. S.—Sulphate of iron, ℥iv.; carbonate of soda, ℥v.; honey, ℥ijss.; syrup and boiling water, sufficient quantity; precipitate the carbonate of iron, wash with the syrup and water, drain and mix the honey, heat until of pilular consistence. Dose.—v. to x. grs.

Ferri Sulphas. L. E. U.S. *Sulphate of Iron.*

Phys. Prop.—*Form*, rhomboidal prisms. *Colour*, bluish-green. *Taste*, acid, styptic, and astringent.

Prep.—*Iron filings* are dissolved in *dilute sulphuric acid*, with evolution of hydrogen; the solution crystallized, and the crystals dried.

Chem. Comp.—This salt consists, when newly prepared, of single eqs. of *oxide of iron* and *sulphuric acid*, with 7 eqs. of *water* of crystallization; one of which is more closely combined than the rest, so that its formula is $FeO, SO^3, HO+6HO$.

Chem. Rel.—The common sulphate of iron of the shops is not a pure proto-sulphate, but is mixed with the persulphate. It frequently also contains a little copper, which is recognised by the

usual tests for that metal. By exposure to dry air the crystals slightly effloresce; when damp they absorb oxygen, and become of a rusty red colour. When heated to redness, colcothar or red peroxide results. A solution of the pure salt, or of any proto-salt of iron, is recognised by the following characters:—Alkalies or their carbonates throw down a precipitate, which is nearly white at first, but soon becomes a dirty green from oxidation. Ferrocyanide of potassium gives a white precipitate, which quickly changes to a dark blue. The *red* prussiate of potash causes an intense blue precipitate (Turnbull's blue). Tannic or gallic acids do not affect the solutions when perfectly free from the persalt.

Oper. and Uses.—It is more irritant and astringent than some of the other preparations of iron, but otherwise possesses their ordinary properties.

Dose.—Gr. j.—v.

Off. Prep.—*Mistura Ferri Comp. L. E. U.S.* (Myrrh, ʒij.; carbonate of potash, ʒj.; sulphate of iron, ℈ijss.; spirit of nutmeg, fʒj.; sugar, ʒij.; and rose water, f℥xviij.) The alkaline carbonate reacting on the sulphate of iron, gives rise to the carbonate of iron in the mixture. It is a very valuable preparation; its slightly stimulant properties rendering it highly useful in some cases of anæmia, and in amenorrhœa. Its constipating effect may be obviated by the combination of some decoction, or extract of aloes with it, while its stimulant action upon the pelvic viscera is augmented. *Dose*, fʒj.—ij.

Pilulæ Ferri Comp. L. E. U.S. (Myrrh, ʒij.; carbonate of soda, sulphate of iron, and treacle, each, ʒj.) This preparation again contains carbonate of iron, and is thus analogous to the preceding, and proves efficacious in similar cases.

Dose.—Grs. v.—xx.

Tinctura Ferri Sesqui-chloridi. *Tincture of Sesqui-chloride of Iron.*

Tinctura Ferri Chloridi. U.S.

Phys. Prop.—*Colour*, reddish-brown. *Odour*, etherial. *Taste* acid, astringent, and styptic.

Prep.—*Red oxide of iron* is digested in *hydrochloric acid* for a few days; and to the sesqui-chloride thus formed in solution, *rectified spirit* is added, and the whole filtered.

Chem. Comp.—Sesqui-chloride of iron, which is the salt present in the tincture, consists of 2 eqs. of *iron*, and 3 eqs. of *chlorine;* and, in this respect, is analogous to the peroxide. Its formula is $Fe^2 Cl^3$. This preparation, besides the spirit, contains hydrochloric acid and hydrochloric ether, formed by the action of the acid on the alcohol.

Chem. Rel.—*Reaction*, acid. *Alkalies, or their carbonates*, throw down the red oxide in a hydrated condition, well fitted for use as an antidote for arsenious acid. The chlorine is indicated by nitrate of silver.

Oper. and Uses.—It is commonly used where the astringent and styptic operation of the ferruginous salts is required in conjunction with their ordinary tonic action, as in passive hæmorrhages and other excessive discharges.

Dose.—♏x.—xxx.

Ferri Potassio Tartras. L. *Potassio-tartrate of Iron.*

Ferri et Potassæ Tartras. U.S.

Phys. Prop.—*Form*, an uncrystallizable powder. *Colour*, greenish-brown. *Taste*, styptic.

Prep.—A *hydrated sesqui-oxide of iron* is prepared by precipitating a solution of the sesqui-oxide in hydrochloric acid by liq. potassæ; this is boiled with *bi-tartrate of potash*, with which it combines; any excess of acid is directed to be saturated by carbonate of ammonia, and the solution then evaporated to dryness.

Chem. Comp.—This salt is one of a bi-basic acid (*tartaric acid*), and contains as its two atoms of base, one of *potash*, and one of *peroxide of iron*. Its formula is $KO, F^2O^3, C^8H^4O^{10}$.

Chem. Rel.—It *deliquesces* when exposed to the air. *Water* dissolves it, but less freely than some of the other salts of iron. The iron is not thrown down from the solution by an alkali.

Oper. and Uses.—Its taste, though styptic, being but mildly so, it is a chalybeate well fitted for administration to children. It

has also the advantage of not being decomposed by alkalies, so that it is compatible with them in prescription.

Dose.—Grs. x.—xxx.

MANGANESIUM.—Eq.=27·72.

Manganesii Binoxydum. *Binoxide of Manganese.*

Phys. Prop.—This occurs native mostly in the form of earthy masses of a blackish colour, in which it is mixed with siliceous and aluminous earths, oxide of iron, and carbonate of lime. In preparing the mineral for chemical uses, it is broken up, the earthy matters washed away, and the oxide reduced to powder. Accordingly, as met with in the shops, it is a blackish impalpable powder, and possessing neither taste nor odour.

Chem. Comp. and Rel.—This oxide consists, as its name imports, of two eqs. of *oxygen* combined with one of *manganese.* When heated to redness, it loses oxygen, being reduced to a compound of two oxides ($MO+Mn^2O^3$), and the same gas is evolved when it is boiled with sulphuric acid, a sulphate of the protoxide being formed. Heated with hydrochloric acid, the latter is decomposed; and while the decomposition of one portion gives rise to the formation of some chloride of manganese, the odd atom of oxygen in the binoxide, by combining with the hydrogen of another, liberates an equivalent of chlorine. *Formula*, Mn, O^2. When sulphuric acid and *binoxide* of manganese react on each other the following are the changes, Mn O^2 and S O^3=Mn O, S O^3 and O; with hydrochloric acid and binoxide of manganese, Mn O^2 and 2 H Cl=Mn Cl and 2 H O and Cl.

Uses.—The only use to which it is applied is for the preparation of oxygen, chlorine, and iodine. The two former in the manner above noticed.

ARSENICUM.—Eq.=75·34 or 37·67.

Acidum Arseniosum. L. E. U. S. *Arsenious Acid.*

Phys. Prop.—*Form*, in cakes. *Colour*, externally for the most

part white like enamel, but internally vitreous, with a slight yellowish tinge. *Odour*, none. *Taste*, none, or very slightly sweetish.

Preparation.—Arsenious acid is condensed in the flues of furnaces, where the ores of nickel, cobalt, and other metals undergo roasting. It is purified by sublimation.

Chem. Comp.—It consists of 1 eq. of *arsenic* and 3 eqs. of *oxygen*. Some chemists, by halving the eq. of the metal, look upon the acid as containing 1 eq. of arsenic to 1½ eqs. of oxygen. Its formula is As, O^3 or As^2O^3.

Chem. Rel.—By keeping, it undergoes a change in its appearance. From being vitreous and transparent throughout, it becomes, as in the arsenious acid mostly found in the shops, opaque and white on the surface; and this extends gradually deeper till the whole mass assumes the same appearance, and its vitreous character is totally lost. This is owing to a change from the state of a glass to a crystalline condition, arsenious acid being in this respect *dimorphous*. Exposed to *heat* it sublimes, and may be easily condensed in octahedral crystals. Cold water dissolves but little of arsenious acid; 100 parts of water at 212° dissolve about 11-5 parts of the opaque variety, which is more soluble than the transparent: on cooling, about three parts remain dissolved, and the solution has a slightly acid reaction. Alkalies dissolve arsenious acid, and form salts (arsenites) not crystallizable. Arsenious acid is more soluble in acid solutions than in water alone.

Tests.—It is important to be able to detect arsenious acid in small quantities, and many means have been devised for accomplishing this object.

Test 1. *Sublimation.*—If arsenious acid is in a free state, and in the form of powder, by heating it in a small test tube we shall find that it rises in vapour, and is again deposited on the sides of the tube in the form of small brilliant octahedral crystals.

2. *Reduction.* If mixed with charcoal in fine powder, and introduced into a test tube with a bulb at the bottom, the application of heat causes the decomposition of the arsenious acid, and the metallic arsenic sublimes in the part of the tube above the bulb, in the form of a dark shining crust; and a garlic odour is given off. If we heat this crust, we find it will again combine

with oxygen, and the arsenious acid thus reproduced will condense in its usual form a little higher in the tube as a white sublimate composed of octahedral crystals.

3. *Formation and decomposition of Arseniuretted Hydrogen.*—When hydrogen gas is evolved from zinc and sulphuric acid in a solution containing arsenic, the hydrogen is evolved not in a free state, but combined with arsenic in the form of arseniuretted hydrogen (AsH^3), and by fitting a jet to the generating bottle, and igniting, we find that the flame has a blue colour, and will deposit on a plate of glass or porcelain, held in the flame, a black stain of metallic arsenic, and around this a cloudiness produced by arsenious acid.

4. *Reduction by Copper.*—If some clean pieces of copper are boiled for a few minutes in a solution of arsenious acid, acidulated with hydrochloric acid, the arsenic is deposited on the surface of the copper as an arseniuret of copper ($As\,Cu^3$), and the whole of the arsenic in solution can be thus collected. Antimony and bismuth, if in solution, are also thus deposited. To ascertain if the coating be arsenic, wash, and dry the pieces of copper with bibulous paper, introduce them into a test tube, and apply heat. Metallic arsenic, if present, will sublime and form a dark ring; and if the heat is continued, arsenious acid can be obtained, as in Test 2.

5. *Liquid Tests.*—1. Sulphuretted hydrogen ($H\,S$), passed through a solution containing arsenious acid, throws down a yellow precipitate of orpiment ($As\,S^3$), soluble in excess of sulphuretted hydrogen; so that, if the quantity of arsenic be small, we must apply heat to expel the excess of gas. The orpiment, when dry, can be reduced, as in Test 2, by means of black flux. 2. A solution of the ammonio-nitrate of silver throws down a yellow precipitate of arsenite of silver; and the ammonio-sulphate of copper, a green precipitate of arsenite of copper (Scheele's green) in solutions containing arsenious acid. Both these precipitates are very soluble in excess of ammonia. 3. Arsenious acid heated to redness with nitric acid, becomes farther oxidated, and arsenic acid ($As\,O^5$) is produced, which gives a red precipitate of arseniate of silver, when a solution of nitrate of silver is added to it.

Operation.—Applied to an ulcerated surface, it acts very

powerfully as a *caustic*. Taken internally in small doses, it sometimes improves the appetite and strength, and has been termed a *tonic*. From its power of stopping the sequency of intermittent diseases, it is highly valued as an *antiperiodic*, being, in this respect at least, equal to quinine in efficacy. When its use is too long continued, or the doses administered too large, more or less derangement of the stomach is produced, heat in the throat and stomach, nausea, relaxation of the bowels, and redness and tenderness of the eyes. In large doses it is powerfully *irritant*, occasioning gastro-enteritis, and a varied train of symptoms, indicative of its poisonous operation. Under its use some chronic diseases *of the skin and other organs* give way; and, on this ground, it has acquired a deserved reputation as an *alterative*.

Uses.—It is used as an escharotic in some malignant and specific forms of ulceration, for the purpose of destroying the unhealthy part, and producing a new and healthy surface; but its external application is attended with great risk, owing to the danger of absorption. The ulcerations of cancer and lupus are not uncommonly thus treated with good effect. As a tonic and antiperiodic it is a most useful remedy in ague and other periodic diseases, such as neuralgia, intermittent headache, and especially in hemicrania. Some chronic diseases, as chronic rheumatism; and the scaly cutaneous diseases, as psoriasis, lepra, and lupus, very commonly yield to its continued use.

Dose.—Gr. $\frac{1}{16}$—$\frac{1}{8}$. It should be rather administered in very small doses often repeated, than in larger doses at more distant intervals; and also should be given immediately after a meal, to prevent its causing irritation of the stomach.

Off. Prep.—*Liquor Potassæ Arsenitis. L. U.S.* (Arsenious acid, and carbonate of potash, each, grs. lxiv., dissolved in water, Oj., and coloured with compound tincture of lavender, f℥iv.) It is more fitted for internal use than the solid acid, as it may be much diluted, and rendered thus less irritating to the stomach.

Dose.—♏iij.—v., and gradually increased.

ANTIMONIUM.—Eq.=129·2, or 64·6.

Antimonii Sesqui-sulphuretum. L. *Sesqui-sulphuret of Antimony.*

Antimonii Sulphuretum. U. S.

Phys. Prop.—*Form,* masses of a striated crystalline texture. *Colour,* ash-gray externally, lead or steel colour on the cut surface. The powder is of a lead-gray colour.

Prep.—It is separated from the impurities in the ore by fusion.

Chem. Comp.—It is generally considered as a sesqui-sulphuret, and consisting of 2 eqs. of *antimony,* with 3 eqs. of *sulphur;* but by doubling the eq. of antimony (see Chem. Introduction), it comes to be considered as a *ter-sulphuret,* and its formula Sb, S^3.

Chem. Rel.—When dissolved in *hydrochloric acid,* sulphuretted hydrogen is given off with formation of the terchloride: on pouring this solution into water, a white precipitate of oxychloride falls, which subsequently assumes a fawn colour. *Boiled in liq. potassæ* it is dissolved; and, on cooling, a reddish-brown precipitate falls, which passes under the name of *Kermes mineral.*

Uses.—It is used for the preparation of the officinal compounds of antimony.

Antimonii Oxysulphuretum. L. *Oxysulphuret of Antimony.*

Antimonium Sulphuretum Præcipitatum. U. S.

Phys. Prop.—*Form,* a light powder. *Colour,* orange or golden.

Prep.—The *native sulphuret* is dissolved by boiling in liq. potassæ, by which two compounds are formed, one composed of single eqs. of sulphuret of potassium and tersulphuret of antimony, and the other of single eqs. of potash and teroxide (Sb, O^3). Sulphuric acid added to the solution decomposes both of these compounds, precipitating oxide of antimony from the one, and sulphuret of antimony from the other, in a hydrated condition.

Chem. Comp.—It consists of 5 eqs. of the *tersulphuret,* and 1 eq. of *oxide,* combined with 8 eqs. of *water.*

Chem. Rel.—It is soluble in nitro-hydrochloric acid, emitting sulphuretted hydrogen.

Oper. and Uses.—It acts mildly on the capillary circulation, in the same way as minute doses of tartar emetic; and, from its operation on the secretions generally, has been called alterative. It enters into the composition of the *pilulæ hydrargyri chloridi comp.*

Dose.—As an alterative, gr. j.—iv.

Pulvis Antimonii Compositus. L. *Compound Powder of Antimony.*

Phys. Prop.—*Form*, a gritty powder. *Colour*, white.

Prep.—It is directed to be prepared by throwing hartshorn shavings and the native sulphuret in powder into a red-hot crucible, constantly stirring till no more vapours rise. The horn is reduced to the state of phosphate and carbonate of lime, and the sulphuret oxidated, with formation of both antimonious acid (Sb. O^4) and oxide of antimony (Sb. O^3). The mass obtained is powdered and heated, so that the antimony may be converted entirely, or nearly so, into antimonious acid, which partly combines with some lime, with evolution of carbonic acid.

Chem. Comp.—It contains *antimonious acid, antimonite of lime, oxide of antimony,* and *subphosphate of lime.*

Oper. and Uses.—It is a preparation by no means to be relied upon, though commonly prescribed by many practitioners as a diaphoretic and alterative.

Dose.—Grs. iij.—x.

Antimonii Potassio-tartras. L. *Potassio-tartrate of Antimony.*

Antimonii et Potassæ Tartras. U. S.

Phys. Prop.—*Form*, rhombic octahedrons. *Colour*, white. *Taste*, disagreeable, nauseous, and metallic.

Prep.—The native sulphuret of antimony is mixed with nitrate of potash and hydrochloric acid, and the powder ignited. A great part of the sulphuret is converted into oxide of antimony by the oxygen of the nitre, while the sulphuric acid which is formed, and the hydrochloric acid combine with the potash, to form sulphate of potash and chloride of potassium, which are removed by

washing. Oxide of antimony, and some undecomposed sulphuret, remain. This oxysulphuret thus formed is boiled with bitartrate of potash; the oxide replaces the atom of basic water in that salt, and the solution obtained is filtered and crystallized.

Chem. Comp.—It consists of 1 eq. of *tartaric acid* with 1 eq. of *potash*, and 1 eq. of *oxide of antimony* combined with it as base. The crystals contain 2 eqs. of *water*. Its formula is $KO, Sb.O^3, (C^8H^4O^{10})+2HO$.

Chem. Rel.—Exposed to the air, the crystals *effloresce* slightly. It is charred by *heat;* and the charred salt, if heated by a blow-pipe flame, yields globules of metallic antimony. *Sulphuretted hydrogen* throws down an orange-red sulphuret from the solution. *Strong acids* decompose the solution, reproducing bi-tartrate of potash, and oxide of antimony. *Alkalies* throw down the oxide from a strong solution.

Adulteration.—The most ordinary impurity is *bi-tartrate of potash*, detected by its imperfect solubility in cold water, and by the precipitate which carbonate of soda causes in a boiling solution of the salt being redissolved. This depends on the precipitated oxide of antimony being redissolved by the acid of the bi-tartrate, if such be present.

Operation.—In full doses, it is a pretty certain *emetic*, its operation being preceded by great depression and nausea. On repetition of large doses, however, this effect ceases to be produced, a tolerance of the medicine being established, often after the second or third administration. When this occurs, it operates very powerfully upon the arterial and capillary systems, diminishing excessive tone in the former, and thus equalizing the circulation in the latter. It is probably by acting in this way, that it proves so highly useful as an antiphlogistic. Sometimes its continued employment occasions an inflammatory state of the stomach and bowels. In smaller doses, its emetic effect is less certain, and if produced, the tolerance is more slow in being established. Its second degree of operation is the inducing of *nausea, general depression*, and muscular relaxation, with *increase of the secretions* generally, which are at the same time more watery in their character. Still smaller doses have little more than the last-mentioned action, and the medicine may thus be denominated diaphoretic, diuretic, and cholagogue. Sometimes

it acts as a purgative, which is partly due to increase of the secretions poured into the alimentary canal, and partly to its local irritant effect. Applied, with friction or not, to the skin, it causes an eruption of a pustular character to appear on the part; and sometimes it becomes absorbed and acts on the system.

Uses.—As an antiphlogistic, in both small and large doses, it is highly useful in almost all acute inflammations, especially those of the lungs and air-passages, which mostly yield on the tolerance being established. As an emetic, it is useful, combined or not with ipecacuanha, in clearing out the accumulated mucus in some cases of chronic bronchitis; and in the early stage of croup, it proves of great service. It has been also recommended for cutting short continued fever in its early stage, and rendering the subsequent course of the eruptive fevers more benignant. Its topical use is valuable where a suppurative counter-irritant is indicated. In phthisis, it often seems not only to relieve pain and diminish inflammation, but also to diminish the excessive purulent expectoration in the latter stages of the disease.

Dose.—As an emetic, grs. i.—ij.; as a nauseant, grs. $\frac{1}{4}$—$\frac{1}{2}$; as a diaphoretic, gr. $\frac{1}{12}$—$\frac{1}{6}$; as an antiphlogistic, gr. $\frac{1}{2}$—iij., repeated every four or six hours.

Off. Prep.—*Vinum Antimonii Potassio-tartratis. L. Vinum Antimonii. U.S.* (Tartar emetic, ℈j., dissolved in sherry wine, f℥x.)

Dose.—As an emetic, f℥ß; a nauseant, fʒj.—ij.; a diaphoretic, ♏x.—xxx.

Unguentum Antimonii Potassio-Tartratis. L. Unguentum Antimonii. U.S. (Tartar emetic, ʒj., rubbed with lard, ʒiv.) It is the most useful form for external application. It contains one part of antimony in five of the ointment.

AMMONIA AND ITS SALTS.

Liquor Ammoniæ Fortior. L. E. *Solution of Ammonia.*

Liquor Ammoniæ. U. S.

Phys. Prop.—A liquid. *Colour*, none. *Density*, lighter than water (·882 Ph. L.) *Odour*, very pungent. *Taste*, acrid and alkaline. It is very volatile.

PREP.—Hydrochlorate of ammonia is distilled in a retort with *slaked* lime and water, and the whole of the liquid is not distilled off. *Theory.*—The hydrochlorate of ammonia and lime react on each other, forming ammonia and chloride of calcium. The ammonia distils over with water, while the chloride of calcium remains in the retort.

CHEM. COMP.—It is a solution of *ammoniacal gas* in *water.* Ammonia itself is composed of 1 eq. of *nitrogen* and 3 eqs. of *hydrogen*, and its formula therefore is NH^3.

CHEM. REL.—1. *Reaction*, alkaline. 2. Combines with *acids* to form salts, which contain, in addition, an atom of water, essential to their constitution. This, added to the ammonia, forms NH^4,O (oxide of ammonium), analogous to K,O (oxide of potassium), and it is with this base, and not with ammonia itself, that the acids are combined in the salts of ammonia. 3. It precipitates *corrosive sublimate* white, being itself decomposed, losing one atom of hydrogen to form amidogen ($NH^3—H=NH^2$), which combines like oxygen with the metal, to form an amide analogous to an oxide. 4. With a solution of a *salt of copper*, it gives a deep blue colour. 5. With a solution of chloride of platinum, it gives a yellow precipitate, a double chloride of platinum and ammonium.

OPERATION.—*Externally* applied, it rapidly produces rubefaction and vesication, and if its application be continued, sloughing and ulceration of the part may follow. *Internally*, it acts in medicinal doses as a powerful diffusible stimulant and antispasmodic, producing a sensation of warmth in the throat and epigastrium, and dispelling flatus.

USES.—Externally. 1. As a rubefacient in chronic rheumatism, and various other painful affections of internal parts. 2. As a vesicant, when it is desired to produce a blister speedily without any previous excitement of the general circulation, as in croup, etc. A piece of rag dipped in liquor ammoniæ, may be placed on the skin, evaporation being prevented by covering with a wine-glass or pill-box. 3. It is commonly inhaled by the nostrils in syncope, etc. Internally, it may be employed whenever a powerful diffusible stimulant is required, and when the general circulation in the course of chronic, or even sometimes acute diseases, is much and dangerously depressed. Combined

with valerian or some other vegetable infusion, it mostly removes the headache of anæmia and atonic dyspepsia. It is used as an antidote for poisoning by digitalis, hydrocyanic acid, etc.

Dose.—♏ v.—xxx.

Tinctura Ammoniæ Composita. L. (Two drachms of mastic are dissolved in nine fluid drachms of rectified spirit, and fourteen minims of oil of lavender, four minims of oil of amber, and a pint of solution of ammonia are added to the clear tincture.) Use, as the preceding. *Dose,* ♏ x.—f℥ß.

Linimentum Ammoniæ. L. E. U. S. (An ounce of solution of ammonia mixed with two ounces of olive oil.) A valuable stimulating liniment.

Ammoniæ Hydrochloras. L. *Hydrochlorate of Ammonia.*

Ammonia Murias. E. U. S.

Phys. Prop.—*Form,* hemispherical thick cakes of a fibrous texture, and translucent. *Consistence,* tough. *Taste,* saline and pungent.

Prep.—The ammoniacal liquor obtained by the distillation of bones, which contains carbonate of ammonia, is neutralized by sulphuric acid, or filtered through sulphate of lime. The sulphate of ammonia, thus formed, is mixed in solution with common salt, by which both sulphate of soda and hydrochlorate of ammonia are formed; on evaporation, the hydrochlorate of ammonia is first deposited in crystals, and being separated, is sublimed.

Chem. Comp.—It consists of single eqs. of *hydrochloric acid* and *ammonia,* and looking upon the salt as a compound of the hypothetical radical *ammonium,* its formula is NH^4, Cl.

Chem. Rel.—*Water* freely dissolves the salt; rubbed with *lime* or an *alkali,* the ammonia is separated and recognised by its odour. With *chloride of platinum,* it gives a yellow precipitate of the double chloride of platinum and ammonium. The chlorine is indicated as usual by nitrate of silver.

Oper. and Uses.—Little is really known with respect to the action of this salt upon the system; some practitioners relying upon it as a powerful remedy, and others regarding it as of very little value. It appears, however, to act something in the same

way as mercury upon the secreting systems generally, augmenting the secretion of the skin, kidneys, or liver, either separately or conjointly. It has been recommended for internal use in various chronic diseases, and even in some acute inflammations, affecting especially the mucous membranes. It is beneficially employed in the declining stage of pneumonia, after mercury has produced its full effect, and is considered also by some to act as an emmenagogue. It is of use, externally, as an ingredient of stimulant and discutient lotions. It is in much more general use in Germany than in this country.

Dose.—Grs. v.—xxx.

Off. Prep.—*Spiritus Ammoniæ Aromaticus. L. U. S.* (Hydrochlorate of ammonia, ℥v., is directed to be distilled with carbonate of potash, ℥viij., some bruised cinnamon and cloves, each ʒij., lemon peel, ʒiv., and rectified spirit, Ov., diluted with an equal quantity of water.) The carbonate of ammonia, resulting from the mutual decomposition of the two salts, comes over with the spirit, impregnated with the volatile principles of the aromatics employed. It is used in the same cases as liq. ammoniæ, with a view to its stimulant operation.—*Dose*, ♏xv.—fʒj.

Spiritus Ammoniæ Fœtidus. L. E. (Hydrochlorate of ammonia, ℥x., is directed to be distilled with carbonate of potash, ℥xvi., some assafœtida, ℥v., and equal parts, Oiij., of rectified spirit and water, the distillation being stopped when half the liquid has come over.) This, in like manner, contains the carbonate of ammonia, and is impregnated with the volatile constituents of the assafœtida. It is of little real use, and might very well be spared from the Pharmacopœia.—*Dose*, ♏xv.—fʒj.

Ammoniæ Sesqui-carbonas. L. *Sesqui-carbonate of Ammonia.*

Ammoniæ Carbonas. U. S.

Phys. Prop.—*Form*, thick cakes or masses. *Colour*, white and translucent. *Odour*, powerfully ammoniacal. *Taste*, alkaline and ammoniacal.

Prep.—Sal-ammoniac is mixed in powder with an excess of chalk, and heat is applied; the carbonic acid combines with ammonia, and the chlorine of the sal-ammoniac with the calcium

of the chalk; the chloride of calcium remains in the vessel, while the carbonate of ammonia sublimes.

Chem. Comp.—The carbonate of ammonia of the shops contains the elements of 3 eqs. of *carbonic acid*, 2 eqs. of *ammonia*, and 2 eqs. of *water*. Hypothetically, it has been considered as a compound of a true carbonate of ammonia, and bi-carbonate of oxide of ammonium and water, and its formula has been stated to be $NH^3, CO^2 + (HO, CO^2 + NH^4, O, CO^2)$.

Chem. Rel.—Exposed to the air, the real carbonate of ammonia evaporates, and the bi-carbonate of the oxide of ammonium remains. Water in small quantity has the same effect, removing the true carbonate. *Reaction*, alkaline; the colour of turmeric being restored by application of moderate heat. With *salts of copper*, it produces the blue ammoniuret; and it effervesces with *acids*.

Adulterations.—Saturated with nitric acid, the presence of a *sulphate* is indicated by chloride of barium, a *chloride* by nitrate of silver.

Oper. and Uses.—It is a diffusible stimulant, and in its action and uses is similar to the liquor ammoniæ. In pretty large doses, it is emetic, though rarely used with this view.

Dose.—Grs. v.—x. as a stimulant and diaphoretic; and grs. xxx., as an emetic.

Off. Prep.—*Liquor Ammoniæ Sesqui-carbonatis. L.* (Sesqui-carbonate of ammonia, ℥iv.; dissolved in water, Oj.)—*Dose*, ♏ xxx.—f℥j.

Linimentum Ammoniæ Sesqui-carbonatis. L. (Solution of sesqui-carbonate of ammonia, f℥j., mixed with olive oil, f℥iij.) Similar in use to the linimentum ammoniæ.

Liquor Ammoniæ Acetatis. L. E. *Solution of Acetate of Ammonia.*

Phys. Prop.—*Form*, a clear liquid. *Colour*, none. *Odour*, slight and agreeable. *Taste*, saline.

Prep.—It is prepared by dissolving sesqui-carbonate of ammonia in distilled vinegar to saturation.

Chem. Comp.—Acetate of ammonia consists of single eqs. of *acetic acid* and *oxide of ammonium.*

Chem. Rel.—The reaction should neither be alkaline nor acid. Sulphuric acid added, causes the odour of acetic acid to be evolved. Liquor potassæ gives rise to the evolution of an ammoniacal odour.

Oper. and Uses.—It is stimulant to the circulation generally, increasing the secretions of the skin and kidneys, and usually considered refrigerant. It is in common use in febrile diseases; and in large doses, has been recommended as a sedative in painful menstruation.

Dose.—f ʒß—ij.

AQUA.

Aqua Destillata. L. E. U. S. *Distilled Water.*

Phys. Prop.—It is clear, colourless, and without taste or odour.

Prep.—Water is to be distilled, the first portions being rejected, and the whole not being distilled over.

Chem. Rel.—Common water contains, as its usual impurities, *sulphate* and *carbonate of lime* (the latter held in solution by carbonic acid), also the *chlorides of sodium*, etc. The salts of *lime* are detected by forming insoluble compounds with solution of soap (lime soaps) or oxalate of ammonia; *sulphates* are detected by the salts of baryta; *chlorides* by the nitrate of silver; and the *carbonate of lime* is thrown down by the addition of any substance capable of neutralizing the excess of carbonic acid (Dr. Clarke's process for purifying hard water). Distilled water, therefore, should not give a precipitate with any of these tests.

Use.—It ought always to be employed in pharmaceutical operations in preference to ordinary water.

SPIRITUS.

Alcohol. U. S.

The London College retains in the Pharmacopœia three forms of spirit: brandy, or *spiritus vini Gallici*; rectified spirit, or

spiritus rectificatus (sp. gr. ·838); and proof spirit, or *spiritus tenuior* (sp. gr. ·920). [The U. S. P. directs *alcohol dilutum*, or equal parts of alcohol and water, instead of the proof spirit of the L., in the formation of tinctures—the sp. gr. of this is, 0·935.]

Prep.—*Brandy* is obtained by the distillation of wines. It contains, however, besides *alcohol*, both *volatile oil* and *colouring matters;* and is, besides, considerably diluted with *water*. These are removed by the process of rectification, which depends upon frequent distillations, each one yielding a stronger spirit. The *spiritus tenuior* is usually prepared by diluting the *spiritus rectif.* till it arrives at the proper sp. gr. *Alcohol* is directed to be prepared by distillation of rectified spirit with chloride of calcium. A better process is that of using anhydrous lime for the purpose of removing the water from the spirit. Its sp. gr. is ·815.

Chem. Comp.—Anhydrous alcohol is the *hydrated oxide* of *ethyle*, a hypothetical radical consisting of 4 eqs. of carbon and 5 eqs. of hydrogen, and represented by the symbol E. Its formula, therefore, will be C^4H^5O+HO. In the alcohol of the Pharmacopœia and the spiritus rectif. and tenuior, this is combined with a definite per-centage of water. The less the water, the lower the sp. gr. of the spirit.

Chem. Rel.—Alcohol is highly combustible, carbonic acid and water being the products of its combustion. Mixed with water, combination takes place, accompanied by the evolution of heat, and also a sensible diminution of bulk. Its solvent powers are very considerable, and are thus enumerated by Mr. Graham: "The hydrate of potash, soda, ammonia, the alkaline sulphurets, and likewise all the deliquescent inorganic salts, except carbonate of potash; but none of the salts which are insoluble or sparingly soluble in water, nor efflorescent salts. It dissolves many vegetable principles, such as sugar, resins, essential oils, soap, castor oil, ethers, alkaloids, and most acids. It does not dissolve the fats and fixed oils."

Strength and Purity.—The strength of spirit is determined by the sp. gr. as given by the hydrometer. An artificial scale of another kind, however, has been introduced, which takes spirit of sp. gr. ·920 as its standard, under the name of *proof spirit*, and expresses the strength of the spirit as so much *over* or *under*

proof. By the term "ten over proof" is to be understood, that the strength is so much greater than the standard, that it would require ten measures of water to be added to each 100 measures in order to reduce it to sp. gr. ·920. The only ordinary impurity is the presence of volatile oil, recognised by the red colour produced on addition of strong sulphuric acid. Fixed impurities are recognised by evaporation, but are not likely to occur.

Operation.—*Externally* applied, the rapidity of its evaporation lowers the temperature of the part if exposed freely to the air, and at the same time hardens the tissue. Used with friction, applied to a mucous membrane, or prevented from evaporating, it proves highly stimulating, causing redness and heat of the part and augmenting the activity of the local circulation. *Internally,* in moderate doses, spirit creates a sensation of warmth at the epigastrium, extending over the whole body, and becoming absorbed acts as a powerful general excitant both to the vascular and nervous systems, increasing the developement of animal heat, and the frequency and fulness of the pulse. In over-doses it produces the well-known symptoms of intoxication.

Uses.—The internal employment of spirit is much the same as that of wine, to which we would refer the reader. Its local employment is either had recourse to as a topical stimulant for threatened sores, or to harden the cuticle about the nipple of females, in whom these parts are liable to become sore when nursing. Its efficacy in evaporating lotions for application to inflamed parts, or to the scalp in inflammation of the brain or its membranes, is much less than that of ether, but nevertheless is useful where a less powerful remedy is requisite.

Off. Prep.—*Mixtura Spiritus Vini Gallici. L.* (Equal parts of brandy and cinnamon water, f℥iv., mixed with the yelks of two eggs, some sugar, ʒß, and a few drops of oil of cinnamon.) *Dose,* f℥ß—iß.

Æther Sulphuricus. L. E. U. S. *Sulphuric Ether.*

Phys. Prop.—Ether occurs as a colourless and light *liquid* of sp. gr. ·750 (Ph. L.). It is extremely volatile, giving off a fragrant *odour,* and possessing a sharp aromatic *taste.*

Prep.—The London College directs that two pounds of *recti-*

fied spirit should be distilled over a sand-bath, with two pounds of *sulphuric acid.* Ether and water come over together, and the process is to be continued until a heavier portion begins to distil. Another pound of spirit is then added to the residue in the retort, and some more ether and water obtained. The products of the two distillations are mixed, and the ether soon separates from the water, and forms an upper stratum. It is poured off, and an ounce of carbonate of potash being shaken with it to remove the remaining water, the ether is again distilled and preserved in a stoppered bottle.

Chem. Comp.—Ether, called also sulphuric ether, is the *oxide* of a hypothetical radical called *ethyle* (C^4H^5), formula C^4A^5O. This oxide possesses the properties of a base, forming salts with acids. With nitrous acid, for example, it forms the nitrite of ether, which enters into the composition of the spiritus etheris nitrici.

Theory of process.—When alcohol and sulphuric acid are brought together, a double salt is formed, consisting of the sulphate of water and the sulphate of ether. This has been called also sulphovinic acid, formula $EO, SO^3 + HO, SO^3$. When the mixture is heated above 284°, this double salt is decomposed, and the ether and water which are liberated distil over. If the alcohol is supplied in proper proportions to the boiling mixture, this process continues to go on, the sulphuric acid acting merely as a catalytic agent; but, if it becomes deficient, the acid and the alcohol are both decomposed, sulphurous acid (SO^2) and carbon are liberated, thus charring the mixture in the retort, and producing a heavier layer in the distilled fluids. If the alcohol is in excess, part of it passes over unchanged, and is mixed with the ether.

Impurities.—Water, alcohol, and *sulphurous acid.* Pure ether should give no acid reaction: it coagulates the albumen from eggs, but not that from blood, by which property its freedom from alcohol may be ascertained. From *water* and *sulphurous acid* it may be separated by simple distillation with carbonate of potash or lime; from *alcohol,* by washing the ether with water, which unites with the alcohol, and re-distilling the ethereal layer with lime.

Chem. Rel.—Ether is combustible, burning with a white flame, and producing carbonic acid and water. It is dissolved in 10 parts of water, and dissolves $\frac{1}{37}$ part. It mixes with alcohol in all proportions. Ether dissolves also a few organic acids and alkaloids; but its solvent powers are much less than those of alcohol; it separates bi-chloride of mercury, and some salts of gold, iron, etc., from their solutions in water.

Oper. and Uses.—The effects of ether are very similar to, but more powerful than those of alcohol. Externally applied it produces cold by its rapid evaporation, or acts as a rubefacient, and even vesicant, if evaporation be prevented. When taken internally, it acts as a powerful and speedy stimulant. Externally it is employed to diminish vascular excitement, or to facilitate the reduction of hernia; and it is sometimes applied as a refrigerant to scalds and burns. Internally, its chief use is in spasmodic affections, as spasmodic asthma, angina pectoris, cramp of the stomach, singultus, etc. When inhaled in the form of vapour, it causes effects very similar to the nitrous oxide or laughing gas. The vapour has been inhaled with advantage in spasmodic diseases of the air-passages.

Dose.—♏ xxx.—f ʒj.

Off. Prep.—*Spiritus Etheris Sulphurici Compositus. L. U. S.* (*Sulphuric ether*, f ℥viij.; mixed with *alcohol*, f ℥xvj.; and a small quantity of *ethereal oil*, f ʒiij.) Stimulant, antispasmodic, and by some supposed to be anodyne.—*Dose*, f ʒß—ij.

Oleum Æthereum. L. U. S. *Ethereal Oil.*

Phys. Prop.—Ethereal oil occurs in the *form* of an oil-like liquid, possessed of an aromatic *odour*, and a bitterish but aromatic *taste*. Its sp. gr. is 1·05 (*Hennell*).

Prep.—The London Pharmacopœia directs that two pounds of *rectified spirit* should be distilled with four pounds of *sulphuric acid* until a black foam arises. The ethereal oil mixed with ether rises to the top of the distilled fluid, and, being removed, is exposed to the air until the ether has evaporated. Some sulphurous acid which accompanies it is removed by subsequent washing with a dilute solution of potash.

Chem. Comp.—Ethereal oil, called also heavy oil of wine, or *sulphate of ether and etherale* (C^4H^4), is represented by the following formula, $Eo\ So^3 + C^4H^4\ SO^3$. It is a product of the action of excess of sulphuric acid on alcohol. Other bodies, as water, sulphurous acid, and carbon, are produced at the same time. This is the cause of the black froth described in the Pharmacopœia.

Oper. and Uses.—It is said to act as an anodyne; and it is used, combined with ether, in the sp. eth. sulph. comp.

Spiritus Ætheris Nitrici. L. U.S. *Spirit of Nitric Ether.*

Phys. Prop.—A colourless transparent limpid *liquid*, sp. gr. about ·834, but varying considerably. It has an agreeable *odour*, similar to that of very ripe apples, and a sharp aromatic and sweetish *taste*.

Prep.—Three pounds of *rectified spirit* are directed to be gradually mixed with four ounces of *nitric acid*, and distilled till thirty-two fluid ounces have passed over.

Chem. Comp.—The spirit of nitric ether contains *water*, *alcohol*, and the *nitrate of ether*, which last compound is represented by the formula, $E\,O,\ N\,O^5$.

Theory of the process.—Nitric acid, when mixed with alcohol, does not unite and form a compound with it, but is decomposed into nitrous acid ($N\,O^3$) and oxygen. The nitrous acid unites with ether from the alcohol, and forms the nitrate of ether, and passes over with excess of alcohol and ether. The liberated oxygen unites with another portion of the alcohol, and forms compounds depending on the temperature, etc. Amongst these are aldehyde, aldehydic, acetic acid, etc.

Chem. Rel.—Spirit of nitric ether usually strikes a *deep olive* colour with the sulphate of iron; probably from its containing the deutoxide of nitrogen ($N\,O^2$). It also strikes a *greenish blue* colour with tincture of guaiacum. By keeping, it becomes strongly *acid*, from the oxidation of aldehyde and the formation of aldehydic and acetic acids.

Oper. and Uses.—It acts as a refrigerant, diaphoretic, and diuretic, and has been used chiefly in febrile affections and some forms of dropsy.

Dose.—f℥ß—ij.

Cerevisiæ Fermentum. *Yeast.*

Production.—When the juice of the grape undergoes spontaneous fermentation on exposure to the air, the nitrogenized substance whose alteration originated the process becomes no longer soluble, and accordingly separates in the form of a mud-like sediment, which is *yeast.* This, when fresh, possesses the property of re-exciting the same process of fermentation in saccharine solutions, accompanied by disappearance of the ferment. When, however, as is the case with an infusion of barley, a nitrogenized body of the proteine class is present, this is altered in the same way as that of the must of wine, and becomes partly deposited and partly raised to the surface, constituting a new formation of yeast.

Phys. Prop—Yeast, from the fermentation of beer, is a yellowish, gray, mud-like substance, having a sourish *odour* and a bitter *taste.* A few years ago Turpin observed, by microscopic examination of yeast, that it contained vesicular bodies enclosing globules; and that during the fermentation of beer they germinated and gave rise to plants allied to the Fungi, which he called *torula cerevisiæ.* But, however true this statement may be, it by no means warrants a further conclusion drawn from it, namely, that the process of fermentation is nothing more than the growth of these plants, and the change of sugar in their organism into alcohol and carbonic acid. Professor Liebig combats this error by several very convincing arguments, among the rest referring to the fact, that in a solution of pure sugar, so far is the yeast from germinating, that it actually disappears during the fermentative process.

Chem. Comp.—Similar to that of *albumen* or *gluten*, but containing a larger proportion of *oxygen.* It appears to be a proteine compound in the process of decomposition. Its power of effecting decomposition is destroyed at a boiling temperature, also by alcohol, strong acids, and several metallic salts.

Oper. and Uses.—When applied externally, it acts as a stimulant and antiseptic, and is chiefly used in the form of poultice. Internally, it has also been given as an antiseptic in low states of the system.

Off. Prep.—*Cataplasma Fermenti. L.* (Flour and yeast mixed together, and a gentle heat applied until it begins to rise.)

Succinum. L. U.S. *Amber.*

Phys. Prop.—Amber is chiefly obtained from the shore of the Baltic, upon which it has been cast up by the sea. It occurs in the *form* of irregular masses, either deficient in *colour*, and more or less transparent, or possessing a yellowish or brownish tinge. It has a conchoidal fracture, and neither *odour* nor *taste.* As regards its *origin*, it is believed to be the fossil resinous exudation from an extinct species of Pinus, portions of the wood of the tree being sometimes embedded within it, as well as insects and other impurities.

Chem. Comp.—Two *resins*, a *volatile oil*, *succinic acid*, and *bitumen* (*Berzelius*). Succinic acid ($HO,C^4H^2O^5$) can be formed also by the action of nitric acid on fats. It occurs in colourless crystals, and has little or no action on the system.

Off. Prep.—*Oleum Succini. L. U.S.* (Amber is directed to be distilled by itself in an alembic, and the oil which comes over with other matters being separated, is redistilled twice.) It is a topical and general stimulant.

Dose.—♏v.—xv.

VEGETABLE MATERIA MEDICA.

NATURAL CLASSIFICATION OF PLANTS.

The vegetable kingdom is distributed under three great *classes*, subsidiary to which the genera of plants are grouped into *sub-classes* and *orders;* and this arrangement is more or less strictly natural.—The *characters* which determine the *primary divisions* are drawn from certain peculiarities which attach to the growth of the stem, leaves, and flowers, as displayed in the anatomy of the embryo, the general aspect of the plant, the structure of its stem, the veinings of its leaves, and the arrangement of its reproductive organs. In the formation of *orders*, characters have been sought in a more minute examination of external appearances; those parts being selected which are the most constant in every plant, and the least liable to be altered by accidental circumstances. These are afforded principally by the *flowers*, *fruit*, and *leaves*. As respects the former, we investigate the presence or absence of the floral envelopes, their mode of æstivation, and the number of their parts; we inquire whether they possess both male and female organs, and, if only one, whether the sexes occur separately upon the same or different individuals; we seek in what way the stamens and pistils grow with regard to each other, or to the parts external to them; and, in the last place, endeavour to learn, by external examination, as well as by section of the ovary, in what manner it is arranged, how it is divided, and the attach-

ment of the ovules to its interior. We examine the fruit to determine whether it is a *pome* like the quince, a *drupe* like the plum, a *capsule* like the poppy, or a *legume* like the cassia, etc. In addition to all this, we must pay some attention to the attachment of the leaves to the stem, whether they are alternate, opposite or verticillate, as well as to the presence and arrangement, or absence, of the stipulæ. The botanist, however, does not found his orders upon differences and resemblances in one of these particulars alone; but, casting his eye over the whole, seizes upon every point which can supply an analogical link, or which displays, on the other hand, an essential diversity of arrangement.

The great value of this system, in a practical point of view, depends, as we have formerly stated, upon the close resemblance in medicinal properties which is observed to obtain in the several individuals of the same group: but, although this rule holds good in the majority of instances, orders nevertheless exist, where individuals manifest effects of a very different nature upon the animal economy. These orders, however, are few, and for the most part very large, while the kinds of operation do not exceed two or three in number throughout the entire of the species they embrace.

Plants are divided into *classes*, as follows:

Class I. Exogens.—*Wood*, in concentric rings. *Leaves*, with reticulated veins. *Flowers*, usually with a quinary division. *Embryo*, dicotyledonous.

Class II. Endogens.—*Wood*, in confused bundles. *Leaves*, with parallel veins. *Flowers*, usually with a ternary division. *Embryo*, monocotyledonous.

Class III. Acrogens.—*Wood*, none, or with a sinuous arrangement. *Leaves*, with forked veins. *Flowers*, none. *Reproduction*, by spores or dissolution of the utricles of tissue.

Class I.—Exogens.

Sub-class 1. *Thalamifloræ.*—A calyx and corolla. Petals distinct. Stamens hypogynous.

Sub-class 2. *Calycifloræ.*—A calyx and corolla. Petals distinct. Stamens perigynous.

Sub-class 3. *Corolliflorœ.*—A calyx and corolla. Petals united.
Sub-class 4. *Monochlamydeœ.*—A calyx only, or none.

Sub-class 1.—*Thalamiflorœ.*

Order 1.—Ranunculaceæ.—*Sepals,* 3 to 6, usually deciduous. *Petals,* 3 to 15, or none. *Stamens,* indefinite. *Carpels,* numerous, or united into a single pistil.

Med. Props. Acrid, narcotic, and poisonous.

Order 2. Magnoliaceæ.—*Flowers,* large, odorous. *Calyx* of 3–6 sepals, caducous. *Corolla* of 3 to many petals, in several rows. *Stamens,* numerous. *Ovaries,* numerous, each 1-celled, with a short style. *Fruit,* various. *Seeds,* with a fleshy albumen. Trees or shrubs, with alternate, coriaceous leaves.

Med. Props. Bitter, stimulant, and tonic.

Order 3. Menispermaceæ.—*Flowers,* unisexual, usually very small. *Sepals,* in one or several rows. *Stamens,* monadelphous or distinct. *Anthers,* turned outwards. In the female, *ovaries* numerous, sometimes soldered together into a many-celled body, which may be occasionally 1-celled from abortion.

Med. Props. The roots of some species are bitter and tonic, while the seeds of some are narcotic.

Order 4. Podophyllaceæ.—*Sepals,* 3–4, deciduous. *Petals,* many, in several rows. *Stamens,* 12-18, arranged in two or more rows. *Stigma,* peltate. *Fruit,* succulent or capsular, 1-celled. *Seeds,* many. *Embryo,* small.

Med. Props. Acrid, purgative. Fruit, edible.

Order 5. Papaveraceæ.—*Sepals,* 2, deciduous. *Petals,* 4, or a multiple of that number. *Stamens,* numerous. *Pistil,* 1-celled, with parietal placentæ. *Herbs and shrubs,* with a milky *juice.*

Med. Props. Narcotic.

Order 6. Cruciferæ.—*Sepals* and *Petals,* 4, and cruciate. *Stamens,* tetradynamous. *Fruit,* a siliqua or silicula.

Med. Prop.—Pungent and mostly edible, being used as condiments.

Order 7. Polygalaceæ.—*Sepals,* 5, very irregular, the two inner being petaloid. *Petals,* 3, one anterior and larger than the rest. *Stamens,* monadelphous. *Ovary,* 2 or 3-celled, with solitary pendulous ovules.

Med. Props.—Roots bitter, stimulant or astringent.

Order 8. Linaceæ.—*Sepals*, 5, imbricated. *Petals*, 5, and twisted in æstivation. *Stamens*, monadelphous. *Ovary*, many-celled, with solitary pendulous ovules. *Leaves*, ex-stipulate.

Med. Props.—Seeds mucilaginous and demulcent.

Order 9. Malvaceæ.—*Sepals*, 5, valvate. *Petals*, 5, and twisted. *Stamens*, indefinite, monadelphous. *Ovary*, many-celled, with solitary ovules. *Leaves*, stipulate.

Med. Props.—Mucilaginous and demulcent.

Order 10. Meliaceæ.—*Sepals*, 3–5, somewhat united at base. *Petals*, 3–5, also cohering at base. *Stamens*, as many, or double as many as petals, monadelphous. *Ovary*, with an annular basal disk, 3–5-celled. *Style*, single. *Fruit*, rarely fleshy, 3–5-celled, each 1–2-seeded. *Trees* or *Shrubs.*

Med. Props.—Bitter, stimulant, or nauseous and anthelmintic.

Order 11. Aurantiaceæ.—*Calyx*, urceolate or campanulate, short. *Petals*, 3 to 5. *Stamens*, inserted into a hypogynous disk, the filaments being sometimes combined into one or several parcels. *Fruit*, many-celled, filled with pulp.

Med. Props.—Rind of the fruit, aromatic and tonic; the pulp, acidulous.

Order 12. Guttiferæ.—*Flowers*, sometimes polygamous. *Sepals*, 2 to 6, persistent. *Stamens*, indefinite. *Ovary*, one or many-celled, ovules solitary or numerous, attached to central placentæ. *Leaves*, opposite, ex-stipulate. Resinous *juice.*

Med. Props.—Containing an acrid purgative juice: the fruit of some species edible.

Order 13. Vitaceæ.—*Flowers*, small and green. *Calyx*, small and nearly entire. *Petals*, valvate. *Stamens*, opposite the petals, and inserted upon the disk. *Ovary*, 2-celled. *Berry*, pulpy. *Leaves*, stipulate. *Habit*, scrambling.

Med. Props. Leaves, acid; fruit, like the grape.

Order 14. Oxalidaceæ.—*Sepals* and *Petals*, five each. *Stamens*, ten, monadelphous. *Fruit*, capsular, membranous, with five cells, and from 5 to 10 valves. *Leaves*, alternate, compound.

Med. Props. Acidulous.

Order 15. Zygophyllaceæ.—*Calyx*, convolute. *Petals*, un-

guiculate. *Stamens,* dilated at the base. *Ovary,* with a disk and 4 or 5 cells. *Leaves,* opposite, stipulate, and without dots.

Med. Props. Stimulant.

Order 16. Rutaceæ.—*Sepals* and *Petals,* dotted, 4 to 5 each. *Stamens,* the same number as the sepals, placed on the outside of a cup-like disk. *Pistil,* with four or five lobes and cells. *Fruit,* capsular, separating into carpels. *Leaves,* ex-stipulate, dotted.

Med. Props. Stimulant and tonic.

Order 17. Simarubaceæ.—*Flowers,* hermaphrodite or unisexual. *Calyx,* in four or five divisions. *Petals,* with a twisted æstivation. *Stamens,* equal or double in number to the petals, placed on a hypogynous disk. *Ovary,* four or five-lobed, containing one suspended ovule in each cell. *Leaves,* ex-stipulate, not dotted.

Med. Props. Bitter and tonic.

Sub-class 2.—*Calycifloræ.*

Order 18. Rhamnaceæ.—*Calyx,* four or five-cleft, valvate. *Stamens,* inserted opposite the cucullate petals, and four or five each. *Ovary,* two, three, or four-celled. *Fruit,* a berry. *Leaves,* stipulate.

Med. Props. Actively cathartic.

Order 19. Anacardiaceæ or Terebinthaceæ.—*Flowers,* small, green, and unisexual. *Calyx,* small. *Petals,* imbricated. *Stamens,* definite. *Disk,* fleshy. *Carpel,* simple. *Styles,* one or three. *Ovule,* solitary, attached to the bottom of the cell by a cord.

Med. Props. Stimulant; some, violent poisons.

Order 20. Leguminosæ.—*Sepals* and *Petals,* five each; the latter either papilionaceous or regularly spreading. *Stamens,* definite or indefinite, perigynous or hypogynous; filaments free, monadelphous or diadelphous. *Fruit,* a legume. *Leaves,* alternate, stipulate.

Sub-order 1. Papilionaceæ.—*Flowers,* papilionaceous.

Sub-order 2. Cæsalpineæ.—*Petals,* regularly spreading and imbricated. *Stamens,* perigynous.

Sub-order 3. Mimosæ.—*Sepals* and *Petals,* valvate. *Stamens,* hypogynous.

Med. Props. Very varied; some affording mucilaginous, astringent, tonic, or cathartic principles.

Order 21. Rosaceæ.—*Sepals* and *Petals*, 4 or 5 each. *Calyx*, lined by a disk. *Stamens*, indefinite. *Carpels*, solitary or several, distinct or consolidated, more or less superior or inferior. *Fruit*, various, but not a legume. *Leaves*, stipulate.

Division 1. Roseæ.—*Fruit*, achænia, enclosed within a false pericarp, formed by the fleshy tube of the calyx.

Division 2. Potentilleæ.—*Carpels*, numerous, superior, indehiscent.

Division 3. Spiræeæ.—*Carpels*, verticillate, follicular.

Division 4. Amygdaleæ.—*Carpel*, single, a drupe.

Division 5. Pomeæ.—*Carpels*, adherent to the calyx. *Fruit*, a pome.

Division 6. Sanguisorbeæ.

Med. Props. More or less astringent. *Fruit*, edible; but the leaves and kernels of some yield hydrocyanic acid and hydruret of benzule, by distillation with water, and are so far poisonous.

Order 22. Myrtaceæ.—*Sepals* and *Petals*, four or five each, the latter quincuncial in æstivation. *Stamens*, indefinite. *Ovary*, inferior, one or many-celled. *Leaves*, dotted, and often having a vein parallel with the margin.

Med. Props. Abounding in an aromatic volatile oil, or containing astringent principles.

Order 23. Umbelliferæ.—*Flowers*, in umbels. *Calyx*, entire or five-toothed. *Petals*, five. *Stamens*, five, inserted round a double epigynous disk. *Ovary*, inferior, two-celled. *Styles*, two. *Fruit*, consisting of two mericarps. *Habit*, herbs with fistular stems.

Med. Props. Variable; some being narcotic and poisonous, as conium; others bearing aromatic fruits, as caraway or anise; and others furnishing fœtid gum-resins like assafœtida.

Order 24. Araliaceæ.—This order differs from the preceding in having more than two cells in the ovary, more than two styles, and the fruit being fleshy.

Med. Props. Stimulant and narcotic.

Order 25. Cucurbitaceæ.—*Flowers*, mostly unisexual. *Calyx*, five-toothed. *Corolla*, five-parted, and scarcely distinguishable

from the calyx. *Stamens*, five, with sinuous anthers. *Ovary*, inferior, with three parietal placentæ. *Stigma*, thick, velvety, or fringed. *Fruit*, fleshy.

Med. Props. Several species contain a powerfully cathartic principle, while the fruit of others is edible when ripe.

Order 26. CAPRIFOLIACEÆ.—*Calyx*, 4 to 5-cleft, with bracts at the base. *Corolla*, rotate or tubular, regular or irregular. *Ovary*, inferior, 1 to 5-celled. *Leaves*, opposite, ex-stipulate.

Med. Props. Variable.

Order 27. CORNACEÆ.—*Calyx*, adherent to ovary. *Petals*, distinct 4–5. *Stamens*, 4–5. *Ovary*, 1–2-celled, with 1 pendulous ovule in each; styles single. *Fruit*, a drupe, with a 1 to 2-celled nucleus, crowned with remains of the calyx. *Leaves*, opposite, ex-stipulate.

Med. Props. Bark bitter, astringent, tonic.

Order 28. CINCHONACEÆ.—*Inflorescence*, varied. *Calyx*, simple. *Corolla*, tubular, regular; and *Stamens*, alternate with its lobes. *Ovary*, surmounted with a disk. *Leaves*, opposite, with interpetiolary *stipules*.

Med. Props. This order contains cinchona and other genera, whose bark is tonic and antiperiodic; ipecacuanha, etc., whose roots are emetic; coffee, etc.

Order 29. VALERIANACEÆ.—*Inflorescence*, a corymb, or panicle. *Calyx*, membranous, or pappose. *Ovary*, inferior, one-celled (two abortive), with a solitary pendulous ovule. *Leaves*, opposite, ex-stipulate.

Med. Props. Roots, more or less stimulant and anti-spasmodic.

Order 30. COMPOSITÆ.—*Flowers*, in heads seated upon a receptacle, and surrounded by an involucrum. *Calyx*, abortive, or with a membranous or pappose limb. *Corolla*, regular or irregular. *Anthers*, united. *Ovary*, inferior, with a single erect ovule.

Med. Props. Some are aromatic and tonic, as the chamomile, and others narcotic, as the lettuce.

Order 31. LOBELIACEÆ.—*Calyx*, 5-lobed or entire. *Corolla*, irregular, 5-cleft. *Stamens*, five, with cohering anthers. *Stigma*, fringed. *Ovary*, inferior, one or two-celled; and, if the former, having parietal placentæ. *Habit*, herbs with a milky juice.

Med. Props. Possessing a juice for the most part of great acridity.

Order 32. Ericaceæ.—*Calyx*, 4 to 5-cleft. *Corolla*, 4 to 5-cleft, hypogynous. *Stamens*, definite, hypogynous. *Anthers*, 2-celled, opening by pores. *Ovary*, many-celled. *Seeds*, wingless. *Habit*, shrubs.

Med. Props. Astringent and sometimes diuretic.

Order 33. Pyrolaceæ.—Differing from the last in having a herbaceous *habit*, and in the seeds being winged.

Med. Props. As the Chimaphila.

Order 34. Styraceæ.—*Calyx*, 5-partite. *Corolla*, hypogynous. *Stamens*, definite or indefinite, and perigynous. *Style*, simple. *Ovary*, several-celled, with one or two pendulous ovules. *Fruit*, drupaceous.

Med. Props. Yielding balsamic products.

Sub-class 3. *Corolliflorœ.*

Order 35. Oleaceæ.—*Calyx*, monophyllous, persistent. *Corolla*, 4-cleft, valvate. *Stamens*, two. *Ovary*, superior 2-celled, with pendulous ovules. *Leaves*, opposite. *Branches*, dichotomous.

Med. Props. This order yields olive oil and manna; but the order is generally characterized by negative properties.

Order 36. Apocynaceæ.—*Calyx*, 5-lobed, persistent. *Corolla*, regular, with a contorted æstivation. *Stamens*, five, distinct. *Carpels*, two, superior, and polyspermous, distinct or united. *Stigma*, one. *Fruit*, bifollicular. *Leaves*, opposite.

Med. Props. Some of the order contain active principles, which affect powerfully the nervous centres, others again are harmless.

Order 37. Spigeliaceæ.—*Flowers*, regular. *Corolla*, valvate. *Ovary*, superior, 2-celled, containing several ovules. *Fruit*, dry. *Leaves*, opposite.

Med. Props. Acrid.

Order 38. Gentianaceæ.—*Calyx*, permanent. *Corolla*, regular. *Ovary*, superior, 1-celled, with parietal placentæ. *Leaves*, opposite and ribbed.

Med. Props. Bitter and tonic.

Order 39. Convolvulaceæ.—*Calyx*, permanent, in five divi-

sions, imbricated in two rows, often unequal. *Corolla*, plaited. *Ovary*, 2 or 3-celled, with few erect ovules.

Med. Props. The order yields roots which possess cathartic powers, as scammony.

Order 40. Solanaceæ.—*Sepals*, *Petals*, and *Stamens*, five each. *Ovary*, 2-celled, superior, and many-seeded.

Med. Props. Narcotic.

Order 41. Scrophulariaceæ.—*Corolla*, irregular. *Stamens*, didynamous. *Ovary*, superior, 2-celled.

Med. Props. The activity of the species varies; we cannot but suspect in all of them properties more or less analogous to those of Foxglove.

Order 42. Labiatæ.—*Corolla*, bilabiate. *Stamens*, didynamous. *Ovary*, four-lobed. *Stem*, square. *Leaves*, opposite.

Med. Props. Abounding in aromatic volatile oil.

Sub-class 4.—*Monochlamydeæ.*

Order 43. Polygonaceæ.—*Fruit*, a three-cornered nut. *Stipules*, ochreate.

Med. Props. The roots of some species contain purgative and astringent principles, while the leaves and stems are acid from oxalic acid.

Order 44. Thymelaceæ. — *Calyx*, tubular, often coloured. *Ovary*, containing a solitary pendulous ovule.

Med. Props. Caustic and vesicant.

Order 45. Myristicaceæ.—*Flowers*, unisexual. *Ovary*, superior, with a single erect ovule. *Seed*, enveloped in an *arillus*.

Med. Props. Aromatic and stimulant.

Order 46. Lauraceæ.—*Anthers*, bursting by recurved valves. *Ovary*, superior, with one or two pendulous ovules. *Leaves*, aromatic.

Med. Props. Aromatic and stimulant.

Order 47. Aristolochiaceæ.—*Flowers*, ☿. *Ovary*, inferior, many-seeded.

Med. Props. Stimulant.

Order 48. Euphorbiaceæ.—*Flowers*, unisexual. *Fruit*, tricoccous. Plants abounding in *milky juice*.

Med. Props. Highly acrid.

Order 49. Piperaceæ.—*Flowers,* hermaphrodite and achlamydeous. *Ovary,* one-celled, with a single erect ovule. Embryo enclosed in a sac. *Leaves,* ex-stipulate.

Med. Props. Bearing hot and stimulant fruit.

Order 50. Urticaceæ.—*Flowers,* unisexual. *Fruit,* a lenticular nut. *Leaves,* alternate and stipulate.

Med. Props. Inconstant; some species possessing tonic properties, and others containing an acrid juice.

Order 51. Ulmaceæ.—*Flowers,* bi-sexual, not amentaceous. *Calyx,* lacerated and membranous. *Ovary,* superior, two-celled. *Fruit,* membranous, with a single seed in each cell.

Med. Props. Tonic.

Order 52. Salicaceæ.—*Flowers,* unisexual, amentaceous. *Stamens,* distinct or monadelphous. *Ovary,* superior, 1–2-celled. *Fruit,* coriaceous, 1–2-celled, many-seeded; seed exalbuminous.

Med. Props. Astringent, bitter, tonic.

Order 53. Juglandaceæ.—*Flowers,* bi-sexual; the males amentaceous. *Ovary,* inferior, 1-celled, ovule solitary. *Fruit,* drupaceous, 1-celled, with 4 imperfect partitions.

Med. Props. Bark, bitter, sometimes purgative.

Order 54. Corylaceæ.—*Flowers,* unisexual; the males amentaceous. *Ovary,* inferior, many-celled, and many-seeded. *Fruit,* one-celled, and one-seeded by abortion, enclosed in an involucrum.

Med. Props. Astringent.

Order 55. Coniferæ.—*Flowers,* unisexual, amentaceous. *Ovary,* a flat scale. *Ovule,* naked. *Fruit,* acrid.

Med. Props. Yielding products similar to turpentine.

Class 2.—Endogens.

Sub-class 1. *Rhizantheæ.*—Fungoid, parasitic plants.

Sub-class 2. *Floridæ.*—Leafy plants, with the floral envelopes verticillate.

Sub-class 3. *Glumaceæ.*—Leafy plants, with the floral envelopes imbricated.

Sub-class 2.—*Floridæ.*

Order 56. Zingiberaceæ.—*Calyx,* tubular. *Corolla,* irregular, with 6 segments in 2 whorls. *Stamens* 3, the two lateral abortive; the filament not petaloid. *Ovary,* inferior.

Med. Props. Aromatic and stimulant.

Order 57. Marantaceæ.—*Calyx*, short. *Corolla*, irregular, with the segments in two whorls. *Stamens*, three, one of the lateral, and the intermediate, abortive; filament, petaloid. *Ovary*, inferior.

Med. Props. Amylaceous rhizomes.

Order 58. Iridaceæ.—*Flowers*, hexapetaloid. *Stamens*, three, with the anthers bursting outwardly. *Ovary*, inferior.

Med. Props. Nothing very obvious: their rhizomes are amylaceous.

Order 59. Smilaceæ.—*Flowers*, hermaphrodite or diœcious. *Calyx* and *Corolla*, confounded, 6-parted. *Stamens*, six. *Ovary*, superior. *Leaves*, reticulated.

Med. Props. Doubtful.

Order 60. Liliaceæ.—*Flowers*, hexapetaloid. *Stamens*, 6, with the anthers bursting *inwardly*. *Ovary*, superior.

Med. Props. Inconstant; some affording purgative, and others stimulant or emetic principles.

Order 61. Melanthaceæ.—*Flowers*, hexapetaloid. *Stamens*, 6, with the anthers bursting *outwardly*. *Ovary*, superior.

Med. Props. Acrid and poisonous.

Order 62. Palmaceæ.—*Habit*, arborescent. *Leaves*, terminal, very large, pinnate or flabelliform, plaited in vernation. *Flowers*, growing on a spadix. *Fruit*, baccate or drupaceous, with fibrous flesh.

Med. Props. Not uniform.

Order 63. Acoraceæ.—*Flowers*, hermaphrodite, surrounded with scales. *Spathe*, leaf-like, not rolled up. *Ovaries*, distinct.

Med. Props. Doubtful.

Sub-class 3.—*Glumaceæ*.

Order 64. Graminaceæ.—*Flowers*, with distinct *glumes* or *paleæ*, or both. *Styles*, 2. *Stems*, cylindrical, usually fistular. *Leaves*, with a split sheath.

Med. Props. Amylaceous, nutritive, and saccharine.

Class 3.—Acrogens.

Order 65.—Filices.—A distinct *stem* and *leaves*, with circinate

vernation. *Reproductive organs,* on the back or margins of the leaves.

Med. Props. Astringent and tonic rhizomes.

Order 66. Lichenes.—Plants spreading in the form of a lobed *thallus.* *Reproductive organs,* embedded in external disks or shields.

Med. Props. Many are bitter and tonic.

Order 67. Fungi.—Plants, consisting of *cellular tissue,* frequently ephemeral in their duration. *Reproductive organs,* lying loose among the tissue, or enclosed in sporidia.

Med. Props. Some species are edible, others highly poisonous.

RANUNCULACEÆ.

Helleborus Niger.—The Black Hellebore.

Polyandria, Polygynia.

A perennial herbaceous plant, with a long horizontal rhizome, from which the leaves and flower-stalks are given off. The former are smooth and pedate, each of the lobes being ovate-lanceolate, and serrated near the point. The flowers are placed either singly or doubly at the extremity of erect cylindrical stalks, having a pair of leaflike bracts at their base. The calyx, which is persistent, consists of five sepals, which, being large and spreading, form the most prominent part of the flower. They are white at first, and, after passing through reddish tints, finally become green. The petals are short greenish tubular organs, placed externally to the stamens.

Habitat.—The hilly parts of Austria, Switzerland, and France. The London College states the *Helleborus officinalis* as the plant which yields the Black Hellebore.

Helleborus. U.S. (*Radix.*) L.

Description.—*Form,* a contorted rhizome, with numerous undivided radicles arising from it. *Colour* of fibres, dark brown externally, whitish within. *Odour,* feeble. *Taste,* at first slight, afterwards bitter and acrid.

Commercial Source.—Hamburgh, sometimes Marseilles.

Chem. Comp.—It contains no alkaloid, but appears to owe its activity to the presence of a *volatile oily acid*, resembling, very much, croton oil. This oil is yielded up to ether, and obtained by its evaporation. It also contains some *salts with gallic acid.*

Operation.—Hellebore is a powerful drastic and hydragogue cathartic, and was formerly in reputation also as an emmenagogue.

Use.—Its chief employment has been in *dropsical* and *cerebral diseases;* and much reliance used to be placed in it for the cure of the several varieties of *insanity.* At the present time, however, other remedies are preferred to it for the purpose of evacuating the bowels in these affections. It is rarely administered now in *amenorrhœa.*

Dose.—Grs. v.—x. of the powdered root.

Off. Prep.—*Tinctura Hellebori. L. U.S.* (Bruised hellebore root, ℥v. [℥iv. U.S.] macerated in proof spirit, Oij.) *Dose,* f℥ß—j.

[*Extractum Hellebori, U.S.* Hellebore, in coarse powder, ℔j.; Diluted alcohol, Oiv. Obtain the tincture by displacement, distil off the alcohol, and evaporate to proper consistence. *Dose,* grs. v.—xx.]

Delphinium Staphisagria.—Stavesacre.

Polyandria Trigynia.

[A biennial herbaceous plant, one or two feet high, with hispid stalk and petioles. The leaves are broad and palmate, five to nine cleft. The racemes are lax, the flowers of a blue or purple colour, and are each succeeded by three large capsules.]

Hab.—South of Europe.

Staphisagri (*Semina*). *L.*

Description.—*Form,* somewhat triangular, pitted on the exterior. *Colour,* blackish-brown. *Size,* about that of a grain of wheat. *Odour,* feeble. *Taste,* bitter and nauseous.

Chem. Comp.—Stavesacre seeds owe their activity to the presence of an alkaloid, *delphinia.* It is *not* crystalline, and almost

insoluble in water. *Formula*, $C^{27}H^{19}N\ O^{2}$(?).—They also contain, besides, woody fibre, starch, gum and wax, some *volatile oil.*

Oper. and Uses.—It is emetic, cathartic, narcotic, and vermifuge, but is rarely employed with a view to these effects, its employment being confined to the destruction of pediculi, when applied in the form of lotion or ointment.

Aconitum Napellus. E.—Monkshood.

Aconitum. U. S.

Polyandria, Trigynia.

A perennial herbaceous plant, having an erect stalk from four to five feet high, and a tapering root. The leaves are lobed and deeply incised, of a deep green on their upper surface, whitish, and more or less downy, beneath. The flowers are arranged in a terminal spike or raceme, and consist of a petaloid helmet-shaped calyx, of a deep violet colour; the petals assuming the form of two-stalked nectaries seen when the galea is turned back. There are several varieties of the species, differing from one another in trifling particulars.

Aconiti Folia.—Aconiti Radix. L.

Description of the Root.—*Form*, tapering, with numerous fleshy fibres proceeding from it. *Size*, three or four inches in length, and about half an inch broad at the thickest part. *Colour*, dark brown. *Odour*, scarcely any. *Taste*, bitter, producing a feeling of numbness on the lips, tongue, and throat.

Chem. Comp.—The activity of aconite depends upon the presence of a powerful alkaloid, *aconitina*, existing in it in small quantity, and procured with great difficulty.—An acid, *aconitic*, is found in the juice combined with lime. It crystallizes in a confused mass, and is soluble in water, alcohol, and ether. It may also be procured by heating citric acid till it becomes coloured. *Formula*, $H\ O,\ C^{4}H\ O^{3}$.

Operation.—Aconite is distinguished more for its anodyne operation, than for its general powers as a narcotic. A sensa-

tion of numbness and tingling is occasioned by the application of the tincture to the lips, its topical effects being more extensive when a portion of the drug is chewed. Dr. Pereira describes the feeling "as if the velum and soft palate were elongated, and rested on the dorsum of the tongue." Its continued internal administration as an anodyne, is followed by tingling and heat of the extremities. Its poisonous action is manifested by vomiting, an uneasy feeling about the throat, loss of general sensibility, coldness of the extremities, and debility: stupor, coma, or convulsions, are not constant phenomena.

Use.—It has been principally employed for the cure of *neuralgia* and *rheumatism*, both as a topical and internal remedy. In the former of these it has been highly rated by all who have employed it; and it has proved equally successful in alleviating the pain which accompanies some serious *organic diseases*, such as *carcinoma*. It is more deserving of confidence in the neuralgic than in the acuter forms of rheumatism; and we would recommend, where the circulation is generally excited, that its exhibition be preceded by the application of depletive measures.

Dose.—Of the powder, gr. j., gradually increased.

Off. Preps.—*Extractum Aconiti. L. E. U.S.* (The juice is expressed from the leaves, previously moistened with water, and evaporated.) *Dose*, gr. j., gradually increased.

[*Tinctura Aconiti. U.S.* Aconite root in coarse powder, ℥iv.; Diluted alcohol, Oij. Make a tincture by displacement. *Dose*, gtts. v.

Extractum Aconiti Alcoholicum. U.S. Distil the spirit from the tincture to the consistence of an extract. *Dose*, $\frac{1}{6}$ of gr.]

Aconitina. (An alcoholic extract is made of the root; which is then dissolved in water, strained, and evaporated: the aconitina is taken up by dilute sulphuric acid, and precipitated by ammonia; the alkaloid is again dissolved in sulphuric acid, decolorized by animal charcoal, and again thrown down by ammonia.) This process, which is that of the London Coll., mostly fails in procuring the alkaloid. It occurs in the *form* of an amorphous powder, having an intensely acrid and bitter *taste*. It is *not volatile*, and should leave no ash when heated to destruction. It is very *soluble* in alcohol and ether, and less so in water. Its salts do not crystallize, but form gummy masses. Pure aco-

nitina is the most virulent poison known. Its *formula* is undetermined.

It is too expensive for general use, but possesses all the properties of the drug in a high degree.

[Coptis Trifolia.—Gold-Thread.

Polyandria, Polygynia.

A small herbaceous plant, with filiform creeping roots of a yellow colour, and evergreen trifoliolate leaves, on long footstalks. The folioles are sessile, cuneate-obovate, and crenately toothed. The scapes are one-flowered, slender. The flowers are white, with the petals much smaller than the sepals, and are succeeded by many follicular capsules, arranged in a stellate form, and containing many small black seeds.

Hab.—In the northern parts of America and Asia.

Coptis. U.S. (*Radix.*)

Description.—*Form,* filamentous. *Colour,* bright yellow. *Taste,* intense bitter, with no astringency. *Odour,* feeble.

Chem. Comp.—These roots owe their properties to a bitter principle, which is soluble in water and alcohol. The tincture is of a rich yellow colour.

Oper. and Uses.—It is tonic and stomachic, and may be employed in all cases where the pure bitters are demanded. It has also attained some reputation in the treatment of aphthous sore mouth. It is generally used in *infusion* made with ℥ß of the root to Oj. water. The *Tincture* is formed of ℥j. of the root to Oj. alcohol.

Dose.—Powder, xx.—ʒj.; infusion, ℥j.—ij.; tincture, fʒj.—ij.]

[Hepatica Triloba.—Liverwort.

Polyandria, Polygynia.

A small herbaceous perennial plant, with fibrous roots. The leaves are all radical, on long, hairy footstalks; they are somewhat coriaceous, and divided into three equal lobes, of a purplish colour beneath, and mottled above. The scapes are as long as the leaves, one-flowered. Flowers of a blue, purplish, or white

colour, and consist of a 3-sepaloid involucrum and 6–9 petaloid sepals, there being no true petals.

Hab.—In the northern parts of Europe, Asia, and America.

Hepatica. U. S. (*Planta.*)

Description.—The whole plant is dried for use. It is scentless and nearly insipid, being a little astringent and mucilaginous.

Chem. Comp.—It owes any powers it possesses to the presence of mucilage and a small portion of tannin.

Oper. and Uses.—It is a very mild demulcent, with slight tonic qualities. It has been much employed in numerous diseases, but principally those of the liver and lungs, but does not appear to be worthy of any confidence. It is given in *infusion*, which may be taken freely.]

[Cimicifuga Racemosa.—Black Snakeroot.

Polyandria, Monogynia.

A tall, herbaceous, perennial plant, with a thick, nodose, black root. The stem is from three to eight feet high, with few leaves. The leaves are ternate, with sessile opposite folioles. The flowers are white, on long racemes, sometimes with shorter ones at their base. The capsules are ovate, blackish, and dry, and contain many small seeds. There are several varieties.

Hab.—In most parts of the United States.

Cimicifuga. U. S. (*Radix.*)

Description.—*Form*, a rough, tuberculated caudex, with numerous radicles; these are very brittle. *Colour*, black or dark-brown externally, within white. *Odour*, feeble and earthy. *Taste*, bitter and astringent, leaving a sensation of nauseous acrimony. The sensible properties are most striking in the fresh root. It should be collected in the autumn.

Chem. Comp.—It contains numerous constituents, but no peculiar principle has been discovered in it. Its sensible properties are more fully imparted to ether than to any other menstruum.

Oper. and Uses.—The black snakeroot has long been a favourite remedy in domestic practice in the treatment of a

variety of complaints, but the profession are by no means in unison as regards its true remedial powers. It may, however, be considered as possessing tonic qualities, and also the property of stimulating the secretory organs, especially the mucous membranes. It has been of much benefit in chronic rheumatism, and was considered by the Indians as acting specially on the uterus, and hence they termed it squaw-root. It is given in powder, decoction, or tincture. The decoction is made with ℥j. of the root to Oj. of water. The tincture, ℥iv. to Oj. diluted alcohol.

Dose.—Powder, ʒß—ʒj.; decoction, ℥j.—℥ij.; tincture, gtts. xx.—fʒj.]

MAGNOLIACEÆ.

Drimys Winteri.—The Winter's Bark Tree.

Polyandria, Tetragynia.

[A large tree, with branches which are tuberculated from the scars of the old petioles. The leaves are oblong, obtuse and glaucous beneath, and are supported on very short petioles. The sepals are of a green colour, two or three in number. The petals are seven, of a milk-white. The fruit is baccate, many-seeded.]

Hab.—At the Straits of Magellan, and in Chili, Peru, and New Grenada.

Cortex Winteri. L.

Wintera. U. S.

Description.—*Form*, in quills about a foot long, and one or two inches wide; the thickness of the bark is several lines. *Colour*, externally, reddish-gray and marked with oval red spots; internally, a dark cinnamon-brown. *Fracture*, compact and presenting a grayish colour on the outside, but reddish within. *Odour*, aromatic. *Taste*, aromatic and pungent.

Chem. Comp.—Drimys Winteri bark contains a *volatile oil*, lighter than water, and possessing an acrid taste, a *resin*, *tannic acid*, besides lignin, salts, etc., amongst which we can detect a

trace of iron. The presence of tannic acid and oxide of iron distinguish it from canella alba bark.

Oper. and Uses.—A good aromatic adjunct to tonic mixtures in some cases of dyspepsia.

Dose.—ʒß—j., in powder or infusion.

[Magnolia Glauca.—Swamp Magnolia.

Polyandria, Polygynia.

A small tree, of from ten to forty feet high, with crooked, divaricated branches, and a smooth, glaucous bark. The leaves are large, elliptical, of a shining green colour above, and glaucous beneath. The flowers are large, and very fragrant, of a white colour, and succeeded by numerous carpels collected in an ovoid cone, of a greenish colour. Each carpel contains a bright red seed, which, when the capsule opens, hangs to it for some time by a long thread.

Hab.—Along most of the Atlantic coast of the United States, in swamps and low grounds.

Magnolia. U. S. (*Cortex.*)

Description.—*Form*, fragments of several inches in length, and one or more broad, somewhat convoluted. *Colour*, smooth and glaucous externally, white and fibrous within. *Odour*, aromatic. *Taste*, warm, pungent, and somewhat bitter.

Chem. Comp.—No detailed analysis has been made of it, but it is most likely that its composition is similar to that of the *M. grandiflora*, which was found to contain a *green resin*, a *peculiar crystallizable principle* analogous to *liriodendrine*, a *volatile oil*, and an *acid*, causing a green precipitate with the salts of iron, but not precipitating gelatine, besides the usual vegetable constituents.

Oper. and Uses.—Magnolia is an aromatic, stimulating tonic, and also produces some action on the skin, and hence has been found useful in intermittent fevers, and in chronic rheumatism. In the first of these complaints it is given in powder or decoction, and in the latter in tincture.

Dose.—Powder, ʒß—ʒj.; decoction, made, ℥j. to Oj., water; ℥j.—ij.; tincture, ʒj.—ʒij.]

[LIRIODENDRON TULIPIFERA.—Tulip Tree.

Polyandria, Polygynia.

A very large tree, from 60 to 100 feet high, with a rugged bark on the trunk and large branches, but smooth on the smaller. The leaves are large, nearly square in their figure, rounded at base and divided into three lobes above, the central being the largest, and truncate at its extremity. The flowers are large, showy, orange-coloured, and resembling a tulip. The seed-vessels are imbricated, formed of winged carpels adhering to a central axis.

Hab.—In most parts of the Middle, Western, and Southern States, but seldom to the east of the Connecticut River.

LIRIODENDRON. U.S. (*Cortex.*)

DESCRIPTION.—*Form.* Fragments of some inches long, with the epidermis removed, light, fibrous, and brittle. *Colour*, yellowish-white. *Odour*, aromatic, but not powerful. *Taste*, pungent, camphorated, and bitter.

CHEM. COMP.—Besides the usual constituents, this bark contains a peculiar crystallized principle, named by its discoverer, Professor Emmet, *Liriodendrine*, and which he deems analogous to camphor in its properties; it is solid, bitter, and inodorous, fusible at 180°, and volatile at 290° F.; it is perfectly neutral, showing neither alkaline or acid reaction.

OPER. AND USES.—Liriodendron is a stimulating tonic, and like the Magnolia, also possesses diaphoretic properties. It has been much used in the treatment of paroxysmal fevers, as well as in rheumatism, dyspepsia, etc. The active principle being volatile, the bark should always be kept in close vessels, and frequently renewed. The bark of the roots is more powerful than that of the tree or its branches. It is given in powder, infusion, or tincture, of which the former is to be preferred.

DOSE.—Powder, ℈j.—ʒij.]

MENISPERMACEÆ.

Cocculus Palmatus. L. E.—The Calumba-plant.

Diœcia, Hexandria.

[A perennial twining plant, with many fleshy, fusiform tubers, giving rise to many annual stems, beset with long glandular hairs. Leaves, alternate, nearly orbicular, lobed, on long footstalks. Racemes, single in female plants, compound in male. The fruit is a berry about as large as a hazel-nut, and covered with long glandular hairs.]

Hab.—Mozambique.

Calumba. (*Radix.*) L.

Colomba. U. S.

Collection.—The roots are collected during the hot season, cut in slices, and dried in the sun.

Description.—*Form,* circular flat pieces, shrunk and depressed in the middle. *Size,* from ½ an inch to 3 inches in diameter, and about ⅓ of an inch in thickness. *Colour* of the epidermis, olive brown; of the centre, pale greenish-yellow. *Consistence,* spongy in the centre, but more firm towards the circumference, brittle. *Fracture,* starchy. *Odour,* slightly aromatic. *Taste,* strongly bitter, the cortical portion most so.

Chem. Comp.—*Lignine, starch,* and *wax* constitute 70 per cent. of the root, the remainder being a *bitter extractive* containing *calumbine;* it also yields a trace of *volatile oil.*—*Calumbine* is a neutral principle, obtained by acting on the root by ether. It contains no nitrogen. It is pretty soluble in boiling alcohol, but not in cold alcohol, ether, or water: boiling acetic acid is its best solvent. Its formula has not been determined.

Oper. and Uses.—Calumba is a simple tonic, possessing no astringent or stimulant action whatever. It is particularly fitted for employment in early convalescence from febrile diseases, and preparatory to the use of bark and other more energetic remedies of the same class. Its infusion is a good vehicle for the administration of the mineral acids in *atonic dyspepsia,* and of the iodides

in strumous and cachectic conditions of the system. From the absence of tannic or gallic acid in its composition, it may also be combined with the salts of iron. The *vomiting* often so troublesome and distressing during the first month of pregnancy, is most effectually relieved by combining it with an effervescing saline.

Dose.—Of the powder, grs. x.—ʒß.

Off. Prep.—*Infusum Calumbæ. L. E. U. S.* (Sliced calumba, ʒß, macerated in boiling water, Oj.) *Dose*, f℥j.—ij.

Tinctura Calumbæ. L. E. U.S. (Sliced calumba, ℥iij., macerated in proof spirit, Oij.) [Colomba, bruised, ℥iv.; diluted alcohol, Oij.; macerate for fourteen days, and filter. U. S.] *Dose*, fʒj.—ij.

Cissampelos Pareira. L. E.—Pareira brava.

Diœcia, Monadelphia.

[A climbing shrub, with a woody and branching root, and a round, smooth stem. The leaves are peltate, subcordate, and pubescent beneath. The flowers are small, and of a yellow colour. The fruit is a berry, which is round and hispid.]

Hab.—South America and the West Indies.

Pareira. U. S. (*Radix.*) L.

Description.—*Form*, cylindrical pieces, transversely wrinkled and longitudinally furrowed. *Size*, very various. *Colour*, brown externally, grayish-yellow internally. *Fracture*, fibrous. *Taste*, bitter and aromatic.

Chem. Comp.—Pareira brava contains a *yellow bitter matter*, which is said to be the active part of the root; and a crystallizable substance called *cissampeline* has been stated to be found in it. Besides this, the root contains starch, resin, and some salts.

Oper. and Uses.—The pareira brava is tonic, and exerts a specific influence over the urinary system, diminishing irritability of the bladder, and lessening the secretion of ropy mucus which accompanies the chronic inflammation of its lining membrane. Where the urine is alkaline, with a disposition to phos-

phatic deposits, nitric acid proves a useful combination. It is said to act sometimes as a diuretic.

Dose.—Of the powder, ʒß—j.

Off. Preps.—*Infusum Pareiræ. L.* (Pareira, ʒij., macerated two hours in boiling water, Oj., and strained.) *Dose*, f℥j.—iij.

Extractum Pareiræ. L. (Prepared as the ext. of gentianæ.) *Dose*, grs. x.—ʒß.

[PODOPHYLLACEÆ.

Podophyllum Peltatum.—May-apple.

Polyandria, Monogynia.

An herbaceous plant, with a long horizontal perennial root, giving rise to a single stem, from six to twelve inches high, dichotomous above, and bearing two large, peltate, lobed leaves. The flower is solitary, and arises on a short peduncle from the axil, and is succeeded by an oval fruit about an inch long, smooth, yellow, succulent, pulpy, with numerous seeds.

Hab.—Throughout the United States, in moist shady situations.

Podophyllum. U. S. (*Radix.*)

Description.—Pieces of various lengths about as thick as a quill, often knotted or annulated at intervals. *Colour*, externally, blackish or deep brown; internally, a dingy white. *Odour*, feeble, but unpleasant. *Taste*, sweetish, bitter, and a little acrid.

Chem. Comp.—It contains *resin*, *starch*, *a peculiar crystallizable* substance, and the usual vegetable constituents.

Podophylline (Hodgson).—When dry, it is in pale brown scales, of some lustre, unalterable in the air, and has a strong bitter taste, very soluble in alcohol, more so in hot than in cold water. Subjected to heat, it fuses and is dissipated in a black smoke.

Oper. and Uses.—Podophyllum is an active cathartic, not unlike jalap in its action, and may be employed whenever that article is indicated.

Dose.—Powder, grs. x.—xx.

Off. Prep.—*Extractum Podophylli. U. S.* (Made like ext. jalapæ.) *Dose*, grs. x.—xv.]

PAPAVERACEÆ.

Papaver Somniferum. L. E.—The White Poppy.

Polyandria, Monogynia.

It is an annual plant, growing to the height of three or four feet, having the stem and leaves universally glaucous. The leaves are large, ovate, toothed, and amplexicaul, and the flowers very large, terminal, and usually white. The form of the capsule is more or less globular, smooth, and crowned by a radiated stigma. When cut across it is seen to contain but one cell; a number of incomplete dissepiments projecting internally from its wall, to which the seeds are attached: it opens by short valves beneath the crown of the stigma.

Hab.—Persia, and the whole of Western Asia and Egypt: cultivated in many parts of Europe.

Papaveris Capsulæ. L.—Poppy-heads (*Capsulæ Maturæ*).

Collection.—Although directed by the London College to be gathered for use when ripe, a much preferable time is about twelve days after the petals have fallen, as at this period they abound in milky juice.

Description of the dried capsules.—*Form*, globular, with a radiated stigma at the top. *Size*, various. *Colour*, light brown. *Texture*, papery and brittle; and, when broken, they are found to contain numerous seeds. *Taste*, slightly bitter.

Oper. and Uses.—From containing the active principles of opium, the preparations of the heads possess similar properties, though in a less certain degree. The decoction is used as a soothing and anodyne fomentation in a variety of painful and inflammatory affections.

Off. Preps.—*Decoctum Papaveris. L.* (Poppy-heads, sliced, ℥iv.), are to be boiled in water, Oiv., and the liquor strained.)

Syrupus Papaveris. L. (Poppy-heads, bruised, without the seeds, ℥xiv., refined sugar, ℔ij., water, *cong.*, ijss., macerate in the water for twenty-four hours, boil down to a gallon, and express, boil liquor to Oij., add sugar.) It is an opiate commonly admi-

nistered to children; but, since its strength is very uncertain, its use should be avoided. The tincture of opium, and Dover's powder, are much better fitted for employment in infantile diseases, as their dose may be accurately proportioned, and the preparations contain definite quantities of opium. *Dose,* f℥ij.—f℥j. For an infant, f℥ß.

Extractum Papaveris. L. (It is made by evaporating a decoction of the capsules without the seeds to a proper consistence.) *Dose,* grs. ij.—x.

Opium. L. E. U.S. (*Capsulæ immaturæ succus concretus. L.*)

Extraction.—Opium is the milky juice of the unripe capsules collected and allowed to concrete. The method usually employed for its extraction is, to make several transverse incisions into the capsule, about seven days after the petals have fallen, care being taken not to penetrate its interior. The milky juice which exudes is allowed to concrete upon the wounds, and in twenty-four hours is scraped off and collected in small vessels. It is then wrought with spatulas till it has acquired a due consistence for being formed into cakes, which are enveloped in poppy leaves, or covered with the capsules of a species of rumex.

Description.—The following are the most important varieties:—

1. Turkey or Smyrna.—*Form,* rounded masses, often flattish on one side, varying, however, considerably, in shape. *Size,* the weight of the masses varies from ½ lb. to 2lbs. *Exterior,* covered with the winged capsules of a species of rumex. *Texture,* soft, apparently composed of agglutinated tears. *Section,* pale brown, with a waxy lustre. *Odour,* strong and narcotic. *Taste,* bitter and acrid. This is the best variety of opium, yielding the largest quantity of morphia.

2. East Indian or Bengal.—*Form,* round balls. *Size,* that of a 24-lb. cannon-ball. *Exterior,* covered with a case of tobacco leaves and agglutinated poppy petals. *Texture,* very soft within the case. *Section,* black and pitchy, soon becoming mouldy on exposure. *Odour and taste,* as the Turkey. A superior variety has lately been imported in square cakes, very carefully prepared, and passing under the name of *garden Patna.* It is nearly as

good as Turkey opium, and possesses most of the external characters of Egyptian.

3. Egyptian.—*Form*, circular flat cakes. *Size*, about three inches in diameter. *Exterior*, covered with poppy leaves. *Texture*, hard. *Section*, of a pale brown colour and waxy lustre. *Odour*, somewhat musty.

4. European.—Very similar to the Egyptian, being hard and dry.

Chem. Comp.—Opium, being the milky juice of a plant, contains, as might be expected, substances common to such exudations, as resin, fatty, gummy, and extractive matters, with a trace of volatile oil, and also several principles peculiar to itself, to which it owes its useful properties as a medicine. All the varieties of the drug agree closely in this respect, slight variation only existing in the relative proportion of the ingredients. These principles may be classed under three heads, viz., acids, neutral bodies, and alkaloids. The acids are the *meconic* and *sulphuric;* the neutral bodies *narcotine*, *narceine*, *pseudomorphine*, and *meconine;* and the alkaloids, *morphia*, *codeia*, and *thebaeia*.

1. *Meconic Acid.*—Prepared from the meconate of lime or lead, formed in the preparation of morphia. It exists in opium combined with the alkaloids. When separated, it forms pearly scales.—It is tri-basic, and its *formula* $3\,HO, C^{14}HO^{11}+6\,HO$.—It is characterized by forming a blood-red colour with the *persalts of iron*. Its solutions are readily decomposed by heat, with the formation of a bi-basic acid, the *comenic* ($2\,HO, C^{12}HO^{8}$), which, exposed to a higher temperature, yields a mono-basic acid, the *pyro-meconic* ($HO, C^{10}H^{3}O^{5}$).

2. *Sulphuric Acid.*—In the form of *sulphate* of morphia, etc.

3. *Morphia.*—The principal alkaloid in the drug, existing in it as a meconate. It is obtained by precipitating any of its salts with ammonia. It forms brilliant prismatic crystals, insoluble in ether, sparingly so in water, but more readily in hot alcohol. It is also soluble in fixed alkalies and lime, but scarcely so in ammonia. It forms finely crystallizable salts.—*Formula*, $C^{35}H^{20}NO^{6}$.—It is characterized by setting free the iodine of *iodic acid* recognisable by starch, by forming an orange-red compound with *nitric acid*, and striking a blue colour with the *neutral persalts of iron*.

4. *Codeia.*—Usually found combined with morphia in the hydrochlorate of commerce: it crystallizes in small octahedrons. —*Formula*, $C^{35}H^{20}N\,O^{5}$. It bears the same relation to morphia which cinchonia does to quina.—It is distinguished from morphia by being soluble in *ether*, but insoluble in a solution of *potash*, by its *not* decomposing *iodic acid*, *nor* forming a red compound with *nitric acid*, while it is *not* precipitated from the dilute solution of its salts by means of *ammonia*. *Tannic acid* causes a copious precipitate in solutions of codeia.—Codeia and its salts appear to act upon the system, much in the same way as morphia, but are said to cause violent itching of the skin.

5. *Thebaeia or Paramorphia.*—The third alkaloid of opium.—*Formula*, $C^{25}H^{14}N\,O^{3}$;—it is distinguished from morphia by its *not* being soluble in *alkaline solutions*, *nor* reddened by *nitric acid;* while it is known from codeia by its *not* forming large crystals, and being *very slightly* soluble in water.

6. *Narcotine.*—A neutral principle, procured either by digesting opium in ether, or by acting on the residue left of it by cold water, by means of acetic acid, and then precipitating with ammonia. It is insoluble in water and alkalies, but soluble in alcohol and ether: its solutions have no alkaline reaction. Some of its salts are crystallizable, but they are acid to test-paper: they are very bitter, and their solutions precipitated by *tannic acid* and the *alkalies.*—*Formula*, $C^{40}H^{20}N\,O^{12}$.—Its action on the system appears very similar to that of quina, many cases of intermittent fever having been treated with it successfully, especially in India.

7. *Narceine.*—Obtained from the mother liquors of morphia, forming silky crystals, with a somewhat metallic taste. They are insoluble in ether, sparingly in water, but very readily in alcohol. Its solution strikes a blue colour with most of the *mineral acids*, and with *iodine*. It has no alkaline reaction, and has no effect upon the animal body.—*Formula*, $C^{32}H^{24}N\,O^{16}$(?).

8. *Meconine.*—A neutral principle of opium, containing no nitrogen, and soluble in water. *Formula*, $C^{10}H^{5}O^{4}$.

9. *Pseudomorphine.*—Found in one or two specimens of opium. It resembles morphia in some of its properties, but does not decompose iodic acid, nor act as a poison upon the system. *Formula*, $C^{27}H^{18}N\,O^{14}$.

An analysis of Smyrna opium, by *Mulder*, gives the following results:—

Morphia .	10·842	Meconic Acid .	5.124	Mucus . .	19·086
Narcotina	6·808	Fat	2·166	Water . .	9·846
Codeia . .	0·678	Caoutchouc . .	6·012	Loss . . .	2·148
Narceine .	6·662	Resin	3.582		
Meconine	0·804	Gummy Matters	26·242		

Chem. Rel.—The watery infusion of opium contains morphia and codeia, combined with meconic and sulphuric acids. Its *reaction* is slightly acid. *Ammonia* precipitates the morphia. *Tannic acid* precipitates the morphia and codeia, as insoluble tannates. *Iodic acid* is decomposed after some time, and shows the free iodine on addition of starch; *nitric acid* also strikes a red colour with the infusion: both these results being due to the presence of the alkaloids. The *salts of lead* and *barytes* give precipitates of the insoluble meconates and sulphates. The *persalts of iron* strike a blood-red colour from the formation of meconate of iron, which may be distinguished from the sulpho-cyanide by the action of a persalt of mercury, destroying the colour of the latter, but not affecting the former. For medico-legal purposes, these tests of meconic acid are more depended upon than those for the morphia contained in the opium.

Adulteration.—The most *obvious impurities* introduced into the drug before importation are sand, small stones, gravel, dust, etc. The less obvious are various *vegetable extracts*, etc., whose detection is necessarily difficult.—The best practical guide to the purity of opium is to select it in the mass, preferring that which possesses the external characters of the finest Smyrna variety.

Operation.—This drug, perhaps the most useful in the whole range of the Materia Medica, has been assumed as the type of the class to which it belongs. In the case of this, if not of other remedies reputed narcotic, a stimulant action precedes the sedative; and, by a proper repetition of the dose, the latter may be delayed for any period. Mostly, however, when a full dose of opium is swallowed, this part of its action is of very temporary duration, and its effects are soon manifested upon the functions of the cerebro-spinal system; pain, if present, is relieved, and stupor or heaviness, followed by sound sleep, is produced, during

which the pulse usually beats more slowly or becomes soft and small, and sometimes a copious perspiration is poured forth. After a variable time the person wakes, and, on rising, the mouth and throat may feel dry, accompanied by some thirst, occasionally headache, a more or less diminished appetite, and sluggish condition of the bowels. But all these unpleasant feelings soon vanish, especially after the operation of a purgative. It has been commonly supposed that sleep produced in this way is less refreshing than that which results naturally; but such a rule by no means holds good in every instance, the very contrary being constantly asserted by patients to whom it has been prescribed.—The poisonous operation of opium is seen in deep and increasing stupor, from which the patient is often with difficulty aroused, paleness of the features, insensibility to external impressions, the pupil being contracted, the respiration slow and stertorous, the extremities cold, and the pulse very feeble or almost imperceptible. Such a state may be expected to terminate fatally, unless counteracted by very powerful stimulants and compulsory exercise.—But, besides being narcotic, opium is powerfully antiperiodic, an action no doubt closely connected with its energetic operation upon the nervous centres. In ague it is scarcely inferior to quina and arsenic, when administered in a judicious manner.

The physiological effects of opium, however, are modified by a variety of circumstances attending its administration, the most important of which are age, custom, idiosyncrasy, combination, and the presence of some diseases.

1. *Age.* It is found that infants are in a peculiar degree susceptible of the influence of the drug, and accordingly its use in their diseases must be guided by the utmost discretion; while its employment cannot be too strongly reprobated when entrusted to the hands of inexperienced individuals. Still it is a remedy by no means to be rejected from their Materia Medica; a proper apportionment of the dose, with careful watching of its effects, being all that is requisite for the avoidance of unpleasant or dangerous results.

2. *Custom.* The extent to which opium may be taken by persons habituated to its use is matter of almost daily observation. Many commence with it in small doses, of their own accord, or

it is prescribed to them by their medical adviser for the production of sleep or the alleviation of pain: others employ it with a view to the pleasurable feelings which it gives rise to, actuated by the same motives as the reveller in intoxicating beverages. In either case the dose first administered ceases in a short time to occasion the effect desired, and then either its use must be abandoned or its quantity steadily increased. The latter is the alternative very commonly adopted; and at length several grains or drachms constitute the daily allowance of the votary of opium. The destructive effects of a habit thus established have been disputed; but, even if we allow that it is not calculated to abridge the space of human existence, we need only refer to the aged and sallow countenance, with the decrepid bearing of the opium-eater, and his pitiable state of mental despondency when deprived of his accustomed stimulus, in illustration of the havoc it is spreading through the constitution at large.

3. *Idiosyncrasy.* The physiological effects of this narcotic vary also with different individuals, in consequence of peculiarities which severally attach to them. These influence not only the energy but also the kind of effect which the same dose gives rise to; in some persons a minimum dose occasioning the full hypnotic action of the drug, while in others several grains will be required for the accomplishment of the same object. With some, the ordinary dose merely occasions restlessness, headache, dryness of the mouth, and general uneasiness or delirium, while in the case of others, after a sleep of several hours, no disagreeable symptoms whatever will present themselves. We have met with an instance in which violent delirium and vomiting resulted from the injection of a small dose into the rectum, while the same, given by the mouth, was followed by none but favourable results. The opposite, however, is commonly observed; and larger doses are borne by the rectum than can be swallowed without inconvenience.

4. *Combination.*—Some of the special effects of opium are modified by combination. Thus ipecacuan increases its action upon the skin, the diaphoretic effect of both being rendered greater: a mercurial obviates much of the constipation which it is apt to induce, and a few grains of camphor enable many patients to

take it, with whom, under other circumstances, it constantly gives rise to headache and vomiting.

5. *The presence of some diseases* for the removal of which opium is prescribed, augments the tolerance which the system exhibits towards the drug. Instances of this are seen in inflammatory diseases, especially of the abdomen and pelvis, tetanus and hydrophobia, with some other serious and painful affections of the nervous system.

Uses.—In discussing the therapeutical value of opium, it will be advantageous to distribute our remarks under the heads of those forms of disease for which it is commonly prescribed.

1. *Pain and Spasm* offer conditions which frequently demand its employment. These, however, are not uncommonly connected with increased vascular activity, either general or confined to the part affected; and, wherever this is the case, the use of opium must be deferred, till general or topical depletion has been practised. The several forms of *neuralgia* and *colic*, unconnected with inflammation, are the states which it is most likely to benefit; and during the *transit of calculi* through either the biliary or urinary passages, it is most strongly indicated by the severe paroxysms of pain which accompany the spasmodic contraction (?) of the duct. For the most part, however, neuralgic affections derive only temporary relief from this drug, tonics being better fitted permanently to benefit the patient. In some severe forms of spasm, moreover, such as *tetanus* and *hydrophobia*, the largest doses of opium have been administered without, in any measure, influencing the progress of the disease; the specific sedatives of the spinal system appear more calculated to remove the excessive display of excito-motory phenomena.

2. *Inflammations.*—There are few diseases of this class for which opium is not prescribed during some part of their course. In some, indeed, a full dose, such as three grains, administered after syncope has been produced by blood-letting, brings the disease at once to a termination, apparently by the prolongation of its sedative effect. This is a mode of treatment of undoubted efficacy in peritonitis and other acute inflammations of organs within the abdomen; but we should hesitate before applying the same method, where the malady is seated in the chest or head. Catarrh, indeed, is commonly cut short by a grain or two of

opium at bedtime, just as it is by a stimulating potion; but our remark has reference to more severe forms of disease, as where the substance of the lungs or brain are the parts affected. There is, however, another mode of using opium in inflammations, where the physician has no longer in view the abrupt termination of the disease, but desires to bring about a favourable issue by gradually influencing the system. With such an object, it is customary to exhibit the opium in more moderate doses; and, according as vascular activity or nervous irritation is chiefly prevalent, to combine it with a greater or less quantity of calomel. Calomel and opium, introduced into British practice by Dr. Hamilton of Lynn Regis, is one of the most valuable means in our possession for combating almost any form of inflammation. As we have referred, under its proper head, to the therapeutical value of the mercurial, we have merely further to state, that the importance of the combination lies in the modification which each drug produces in the operation of the other. The opium relieves pain and spasm, and induces quietude, while it also assists the calomel in producing its constitutional effect, by lessening that which it exerts upon the intestinal secretions. As regards *chronic inflammation*, opium is seldom ordered with any expectation of modifying the vascular condition of the part, its principal indication being the relief of pain and irritation, the diminution of excessive secretion, or the production of sleep.

3. *Fevers.*—The use of opium in continued and exanthematous fevers, is almost entirely directed to the state of nervous irritability and defective sleep which accompany their more asthenic forms. When judiciously administered under such circumstances, it exerts a quieting influence over the nervous system, allaying the tremors and spasms which affect the muscular system, restoring the mental faculties disturbed by delirium, and producing refreshing and salutary sleep. In prescribing opium, however, in these cases, the same precautions must be observed as in the exhibition of wine, namely, a careful avoidance of it when the tongue is dry and brown, the skin harsh and burning, or the countenance flushed, with much injection of the vessels of the conjunctiva; and also, whenever these signs of its unfavourable action arise during its use. During the convalescence from fever, an occasional opiate at night is often sought by the patient, and may be

safely allowed by his medical attendant, although its constant employment is not, by any means, to be recommended.—We have alluded to its antiperiodic operation in *ague*. Given before the cold stage sets in, it either wholly puts a stop to its accession, or modifies the course of the entire paroxysm; and, when administered during the hot, favours its speedy termination in the sweating stage. Its use is especially indicated where great irritability of the stomach constitutes a complication of the disease.

4. *Hæmorrhages* and *fluxes* are decidedly influenced by varied doses of the drug, on which account it has been often called an astringent. Its operation, in this respect, however, would appear to bear no resemblance to that of tannic or gallic acid. *Menorrhagia*, among the hæmorrhages, and *diarrhœa* among the fluxes, seem to be most powerfully affected by its employment: in the former case, it is commonly combined with acetate of lead; but it often is found to remove the attack when administered alone.

5. Some forms of *sloughing ulcers* appear to be, in a great degree, under the control of opium; but the dose must be large, and its repetition continued. Phagedenic, venereal, or hospital sores, the result of an unhealthy state of the general constitution, or of local and infectious causes, require that the patient shall be kept during the whole treatment under the influence of the drug. We can confidently recommend a similar use of opium in some forms of mercurial ulceration of the mouth.

6. *Urinary Diseases.*—Putting aside the inflammatory diseases to which the urinary organs are subject, and the irritable state of the bladder and excretory canals, as referable to former categories, we allude more especially here to those diseases which manifest themselves rather by an alteration in the secretion, than by symptoms pointing more evidently to the organs themselves. *Diabetes* is one of these affections, in which sugar is daily discharged to a greater or less amount in the urine. This state is accompanied by great irritability of the nervous system, peevishness, anxiety, and a constantly dry and harsh skin; and while the dietetic treatment is steadily pursued, with a view to the cure of the disease, these symptoms are much alleviated by the frequent administration of moderate doses of opium. It is exhibited with

a similar object when the urine abounds in *the phosphates* or in *urea*, the influence which it exercises over the change of tissues in the body, perhaps being the mode in which it affects the morbid composition of the secretion itself.

7. *Mental Diseases.*—The good effect of opium in the treatment of *insanity* has, like every other active remedy in this class of diseases, been the subject of much difference of opinion; and it is difficult to say to what cases opiates are best adapted. In *acute mania*, Dr. Conolly places less confidence in them the more he sees of their employment (*MS. notes of Lectures*). In *delirium tremens*, however, no doubt of the efficacy of opium is held, when administered in moderate doses during the day, and increased in quantity towards night, so as to favour the natural tendency to sleep at this period. Its constipating effect must be guarded against by an occasional aperient.

8. *Topically.*—Other narcotics are of more value than this, but still we employ it commonly by way of friction for the relief of *neuralgic or rheumatic pains*, combined or not with some rubefacient. Its local employment proves serviceable in some spasmodic affections also, as where it is used as a suppository for the prevention of the *chordee* of gonorrhœa, and the resolution of a *spasmodic stricture.*

Dose.—Grs. j.—iij. In some diseases, as hydrophobia and tetanus, much larger quantities have been administered.

Off. Preps.—*Confectio Opii. L. U. S.* (Powdered opium, ℈vj., long pepper, ℥j., ginger, ℥ij., caraway, ℥iij., and powdered tragacanth, ℈ij., rubbed with syrup when about to be used.) *Dose*, grs. x.—℈j. About 36 grs. contain one gr. of opium. [The U. S. P. directs powdered opium, ℈ivss., aromatic powder, ℥vj., honey, ℥xiv.]

Emplastrum Opii. L. E. U. S. (Powdered opium, ℥ss., resin of spruce fir, ℥iij., lead-plaster, ℔j., and water, f℥viij., boiled over a slow fire to a proper consistence.) A topical application in rheumatic and neuralgic affections. [The U. S. directs powdered opium, ℥ij, burgundy pitch, ℥iij., lead plaster, Oj., and boiling water, f℥iv.]

Enema Opii. L. (Tincture of opium, mixed with decoction of starch.) Used in dysentery and other painful affections of the pelvic organs.

Extractum Opii Purificatum. L. (A solution of opium, ℥xx., in water, *cong.* j., evaporated to a due consistence.) *Dose*, the same as of opium.

Linimentum Opii. L. (Soap liniment, f℥vj., with the addition of tincture of opium, f℥ij.) Anodyne and rubefacient.

Pulvis Cretæ Compositus cum Opio. L. (Compound chalk powder, ℥vjß, mixed with powdered opium, ℈j.) Astringent and narcotic, used in diarrhœa. *Dose*, ℈j.—ij. 40 grs. contain 1 gr. of opium.

Tinctura Opii. L. E. U.S. (Powdered opium, ℥iij.; macerated in rectified spirit, Oij., and filtered.) [The U. S. orders opium, ℥ijß; diluted alcohol, Oij. Macerate for 14 days, express, and filter.] *Dose*, ♏x.—fʒj. 19 minims contain 1 gr. of opium.

Vinum Opii. L. E. U. S. (Purified extract of opium, ℥ijß, with bruised cinnamon and cloves, each ʒijß, macerated in sherry wine, Oij.) *Dose*, as of Tinct. Opii. [The U. S. directs opium, ℥ij.; cinnamon and cloves, each, ʒj.; and wine, Oj. Macerate for 14 days, and filter.]

[*Tinctura Opii Acetata. U. S.* (Opium, ℥ij.; vinegar, f℥xij.; alcohol, Oß.) Macerate for 14 days, and filter. *Dose*, ♏x.

Tinctura Opii Camphorate. U. S. (Opium, benzoic acid, each, ʒj.; oil of anise, fʒj.; honey, ℥ij.; camphor, ℈ij.; diluted alcohol, Oij.) Macerate and filter. *Dose*, fʒj.—iij. (See *Tinct. Camph. Comp.*) An ounce contains 2 grs. of opium.

Acetum Opii. U. S. (Opium, ℥viij.; nutmeg, ℥jß; saffron, ʒß; sugar, ℥xij.; distilled vinegar, q. s.) Digest with Ojß of the vinegar on sand-bath, strain, repeat with same quantity of vinegar, filter, add vinegar to make Oiij., then the sugar, and evaporate to Oiij.—℥iv. *Dose*, gtts. vj.—xxv.]

There are officinal preparations passing under the name of other drugs, however, whose activity depends either wholly or in great part upon the opium they contain.

Pilulæ Ipecacuanhæ Comp. L. Dose, grs. v.—x.

Pilulæ Saponis Comp. L. Dose, grs. iij.—x. 5 grs. contain 1 gr. of opium.

Pilulæ Styracis Comp. L. Dose, grs. v.—xv. 5 grs. contain 1 gr. of opium.

Pulvis Ipecacuanhæ Comp. L. Dose, grs. v.—xv. 10 grs. contain 1 gr. of opium.

Pulvis Kino Comp. L. *Dose*, grs. v.—℈j. 20 grs. contain 1 gr. of opium.

Tinctura Camphoræ Comp. L. *Dose*, f℥j.—f℥ß. A fluid ounce contains nearly 2 grs. of opium.

Unguentum Gallæ Comp. L.

The alkaloid morphia and two of its salts are included among the Off. Preps. of the drug by the London College. We give the processes as ordered in the London Pharmacopœia.

Morphiæ Hydrochloras. L. U. S.

Prep.—A carefully made *watery solution* of opium is precipitated by *chloride of lead*, so as to leave the hydrochlorates of morphia and codeia in solution, while the lead forms insoluble salts with the meconic and sulphuric acids. The solution is crystallized; and the crystals, being redissolved, are purified by *animal charcoal*. The morphia is then thrown down by *solution of ammonia*, leaving codeia unprecipitated; and, after being redissolved in *hydrochloric acid*, is again exposed to the action of animal charcoal, and finally evaporated for the formation of crystals.

Prop.—It forms feathery acicular crystals of a bitter taste, and soluble in water and alcohol.

Morphia. L. U. S.

Prep.—The *hydrochlorate* is directed to be *dissolved in distilled water* and precipitated by *solution of ammonia*. [The U. S. directs opium, sliced, ℔j.; distilled water and alcohol, q. s.; solution of ammonia, f℥vj. Dissolve the opium in the water, evaporate to Ovj., and filter; add alcohol, Ov., and f℥iij. of the sol ammonia, mixed with alcohol, Oss. In 24 hours add the remainder of the ammonia in the same quantity of alcohol. The morphia deposits by rest.]

Prop.—Described under *Chem. Comp.* of Opium.

Morphiæ Acetas. L. E. U. S.

Prep.—*Morphia*, ℨvj., is directed to be dissolved in *dilute*

acetic acid, and the solution evaporated for the formation of crystals.

Prop.—It should be in the form of colourless radiated crystals, soluble in water; but, as met with in the shops, it is mostly imperfectly crystallized, and less soluble in water, unless on addition of a few drops of acetic acid.

Oper. and Uses of Morphia and its Salts.—The effects of morphia and its salts upon the system are very similar to those of opium; but they appear less apt to occasion disagreeable symptoms, such as nausea or headache, either during their operation, or subsequently to the cessation of their hypnotic action. They are employed internally, therefore, in place of the crude drug, for persons in whom these effects are liable to occur, and also upon the ground of their constituting a more elegant mode of administering the narcotic. They are well fitted, moreover, for endermic use, and a grain or a grain and a half may be sprinkled at each dose upon a blistered surface, for the alleviation of neuralgic or rheumatic pains. This method, however, is sometimes followed by the appearance of an eruption like *eczema*, either partial or extending over the entire body.

Dose.—Gr. $\frac{1}{4}$—$\frac{1}{2}$ of either of the three last preparations.

Bi-meconate of Morphia.

Prepared by adding freshly precipitated morphia to meconic acid in solution. It occurs in minute crystals of a white colour, soluble in water: the solutions give the reaction due to meconic acid and morphia. It is an acid salt, for meconic acid is tri-basic, and in the bi-meconate of morphia there are 2 eqs. of morphia and 1 eq. of water to each eq. of acid.

This salt exists in opium, but cannot be crystallized from the solution, on account of the other ingredients mixed with it.

Uses.—It acts in a manner similar to the other salts of morphia.

Dose.—Of bi-meconate, gr. $\frac{1}{4}$ and upwards.

Sulphate of Morphia.

This salt also occurs in opium in small quantities, but is prepared by neutralizing sulphuric acid with morphia, and crystal-

lizing. It occurs in acicular crystals, having for their composition 1 eq. of morphia + 1 eq. of sulphuric acid + 6 eqs. of water, 1 eq. of water being held much more firmly than the remaining five, as in the sulphates of iron, copper, etc., and the salt is decomposed before it is expelled.

Uses.—The same as the hydrochlorate, etc.

Dose.—Gr. ß.

[*Liquor Morphiæ Sulphatis. U. S.* (Sulphate of Morphia, gr. j.; water, f℥j.)—Dose, f ʒj.—ij.

Many other salts of morphia have been formed, but they possess no medicinal peculiarity.]

Papaver Rhæas. L. E.—The Red Poppy.

Polyandria, Monogynia.

Like the preceding species, this is an annual, growing very commonly in the corn-fields of Europe; the stem and leaves, which are pinnate, being covered with rough hairs. The flowers are large, of a rich scarlet colour, and placed at the extremity of long peduncles. The capsule is very much smaller than that of the white poppy, but agrees with it in all essential points of structure.

Rhæas. L. (*Petala.*)

Description.—They have an opiate and disagreeable *odour* and bitter *taste.* They contain a *colouring matter*, for which they are prized, and probably a small quantity of *morphia*, etc., also.

Oper. and Uses.—The petals possess very feeble narcotic powers; their use being as a colouring ingredient.

Off. Prep.—*Syrupus Rhœados. L.* (An infusion of the petals made into a syrup with sugar.)

[Sanguinaria Canadensis.—Blood Root.

Polyandria, Monogynia.

A small herbaceous perennial plant with a tuberous, horizontal, fleshy root, abounding in a reddish and acrid juice. The leaves are radical, reniform, and lobed, on long footstalks. The

flowers are solitary, on a naked scape, sheathed at base. The petals are white, and variable in number. The fruit is a capsule, which is oblong, one-celled, two-valved, containing numerous oval reddish-brown seeds.

Hab.—It grows in most parts of the United States, in open woods, flowering early in the spring.

Sanguinaria. U. S. (*Radix.*)

Description.—*Form*, in pieces one or two inches long and from a quarter to half an inch thick, much wrinkled, flattened, and twisted. *Colour*, brownish-red externally, and bright orange internally, but becoming brown by exposure; when powdered, of a brownish-orange. *Odour*, faint narcotic. *Taste*, bitter and acrid, the impression on the mouth continuing for some time.

Chem. Comp.—No complete analysis of this root has been published, but a peculiar principle has been obtained from it, by Dr. Dana, which he has called *sanguinarina*. This is procured by digesting the powdered root in pure alcohol, and precipitating with ammonia. The precipitate is treated with animal charcoal, digested in alcohol, and evaporated to dryness. The pearly, white result is the sanguinarina. It is very acrid, is alkaline, combines with acids, forming highly coloured red salts. It is but little soluble in water, but readily so in ether or alcohol.

Oper. and Uses.—Sanguinaria is an acrid emetic, with stimulant and narcotic qualities. When given in small doses, it acts as a stimulant, in larger, causes vomiting, and in over-doses most of the symptoms of the acro-narcotics. Externally, it acts as an escharotic to ulcers. It has been used with success in many diseases of the respiratory organs, and also in rheumatism, and some derangements of the liver.

Dose.—Stimulant and alterant, gr. ij.—v.; emetic, gr. xv.—xx.; infusion made with ʒß to Oj., water, f ʒß—j.

Off. Prep.—*Tinctura Sanguinariæ. U. S.* (Sanguinaria, bruised, ℥iv.; diluted alcohol, Oij. Macerate and filter.) *Dose*, as an alterant, f ʒß—j.; as an emetic, f ʒß.

CRUCIFERÆ.

Cardamine Pratensis.—Cuckoo-flower.

Tetradynamia, Siliquosa.

A perennial herb, which grows abundantly in moist meadows, and flowers in the spring. The stem is smooth, about a foot high, with pinnated leaves, the segments of the radical ones being rounded, while those of the cauline are linear. The flowers of a purplish colour, are arranged on a short raceme. The siliqua is linear, with flat nerveless valves, which often separate with elasticity. The whole plant has a pungent taste, similar to water-cress.

Hab.—Many parts of Europe.

Cardamine. (*Flores.*) L.

Description.—The fresh flowers possess some degree of bitterness and pungency, both of which they lose when dried.

Chem. Comp.—Any activity the flowers possess depends upon their containing a trace of *volatile oil* and a *bitter extractive* matter. By drying, the former is dissipated and the odour lost.

Oper. and Uses.—They have been said to be stimulant, diaphoretic, and diuretic; and were supposed of service in the cure of some *nervous affections*, such as chorea and epilepsy. They are never prescribed now.

Cochlearia Armoracia.—Horse-radish.

Tetradynamia, Siliculosa.

[An herbaceous perennial, with long cylindrical, very pungent roots, and large, oblong crenate radical leaves, the cauline ones elongate, lanceolate, incised. Flowers, white, silicule sessile, ellipsoid.]

Hab.—A well-known plant, indigenous to Europe, naturalized in this country.

Armoracia. U. S. (*Radix recens.*) L.

Description.—The horse-radish root scarcely requires description. It possesses a very pungent taste, and emits, when scraped, an acrid vapour, which excites the secretion of tears.

Chem. Comp.—Its acridity depends on the presence of *volatile oil*, and is destroyed by drying.

Oper. and Uses.—Horse-radish is stimulant and excites vomiting when taken internally in the form of an infusion: with the former view it has been said to be useful in some forms of dyspepsia, and with the latter is employed sometimes in cases of *narcotic poisoning.*

Dose.—ʒß or more.

Off. Preps.—*Infusum Armoraciæ Comp. L.* (Equal weights of horse-radish, and bruised mustard-seeds, ℥j. each, are infused in boiling water, Oj., and somecompound spirit of horse-radish, f℥j. added.) *Dose,* f℥j.—ij.

Spiritus Armoraciæ Comp. L. (Proof spirit, *cong.* j., distilled with horse-radish; dried orange peel, each, ʒxx.; nutmeg, ʒv.; and some water, Oij.) *Dose,* f℥j.—iv.

Infusum Armoraciæ. U. S. (Horse-radish, sliced, mustard, bruised, each, ℥j.; boiling water, Oj.; macerate and strain.) *Dose,* f℥i.—ij.

Sinapis Nigra.—Black Mustard.

Tetradynamia, Siliquosa.

An annual erect plant, with yellow flowers, arranged in a raceme, and succeeded by smooth and somewhat tetragonal siliques, with the seeds in a single row. The lower leaves are lyrate, the upper quite entire, lanceolate, and stalked.

Hab.—Europe, cultivated in the United States.

Sinapis. U. S. (*Semina.*) L.

Description.—*Form,* rounded and small. *Colour,* externally, brownish-black, internally, yellow. *Taste,* acrid, bitter, and oleaginous.

Prep.—The flour of mustard is manufactured both from the

white and black varieties, although the latter alone is admitted into the Pharmacopœia as its source. The method employed by all manufacturers appears not to be exactly the same. The fundamental part of the process is grinding and carefully pounding the seeds, and separating the finer part by sifting. This yields the best flour for medicinal use; but much of what is sold for the table is made from pressed seeds, thus deprived of their pungency, or this is diminished by the addition of wheat flour. In the latter case, turmeric is added to restore the proper amount of colour, and chili pods or ginger to raise the acrimony to the correct standard.

Chem. Comp.—The black mustard seed does not contain the volatile oil of mustard ready formed; but peculiar principles reside in it, by the reaction of which upon each other, with the presence of water, the oil is produced. The nature of these principles has not been very well made out. One belongs to the albuminous class, and is called *myrosyne* or *emulsine of mustard;* the other has been called *myronic acid*, and is said to form crystallizable salts. It contains sulphur and nitrogen in its composition; but its formula has not been determined, and some doubt may be entertained whether it be an acid at all. A solution of this substance in water yields the oil, when the myrosyne or albumen of either black or white mustard is added to it. A third substance, called *sinapasine*, neutral and crystalline, has been obtained from black mustard seed: it very much resembles unsaponifiable fats.

Volatile oil of mustard.—Made by distilling the marc of black mustard seeds with water. The theory of its production has been stated above. It has a sp. gr. 1·038, a yellowish colour, and acrid taste and smell. *Formula*, $C^8H^5NS^2$; with ammonia it forms a white crystalline compound, consisting of one atom of the oil, and one atom of ammonia, called Thiosinamine. Two other crystallizable substances, called Sinnamine and Sinapoline, possessing basic properties, have been obtained from this oil, by depriving it of its sulphur by the action of oxide of lead, baryta, &c.

Black mustard seeds contain also a large quantity of *a fixed oil*, which possesses the usual properties of fixed oils obtained from seeds.

Chem. Rel.—The catalytic or decomposing power of the *myrosyne* or *albumen* is impaired by *boiling water, alcohol, vinegar*, etc. Hence, in preparing mustard poultices, we should avoid the use of these substances. A temperature of about 90° is most favourable to the production of the oil.

Operation.—Mustard is a topical stimulant and rubefacient, giving rise also to a burning sensation in the part to which it is applied. When taken internally in small doses, it assists the digestive process, but in large doses proves a direct emetic.

Uses.—Sinapisms are commonly used *as derivatives* for a variety of purposes, where the more powerful and vesicant operation of a blister is not desired. Many *local pains*, occurring in the chest and abdomen, as well as *spasmodic attacks* of *dyspnœa* or *colic*, are often relieved by this means. They are sometimes applied to the feet and calves of the legs of persons labouring under *coma;* and we have found the constant use of them to the spine every night for several weeks, a most successful mode of removing symptoms which we have had reason to regard as indicative of a *congested state of the spinal meninges.* Where the sensibility is defective in palsy, the operation of sinapisms should be very carefully watched; since they are apt, if too long continued, to occasion sloughing and ulceration.—The emetic properties of mustard fit it for internal use in cases of narcotic poisoning.

Dose.—As an emetic, one to three tea-spoonsful of table mustard mixed with a few ounces of water.

Off. Prep.—*Cataplasma Sinapis. L.* (Equal parts of mustard and linseed meal are directed to be mixed to the proper consistence of a poultice with boiling vinegar.) Vinegar as above noticed diminishes the activity of the true flour of black mustard. The ordinary way of making a mustard poultice, is to mix equal parts of bread crumbs and good flour of black mustard into a paste, with warm, but not boiling, water, or merely to spread a thin layer of mustard, as used for the table, upon a piece of linen.

POLYGALACEÆ.

Polygala Senega.—The Seneka.

Diadelphia, Octandria.

[A perennial herbaceous plant, with a contorted branching root, giving rise to several annual, erect, simple stems, about a foot in height. Leaves, alternate, almost sessile, ovate, lanceolate. Flowers small, white, in a somewhat spiked raceme. Capsule small, containing two blackish seeds.]

Hab.—The United States.

Senega. U.S. (*Radix.*) *L.*

Description.—*Form*, an irregular tuberosity, or root-stock, giving off two principal roots, which are contorted, surrounded by ringed eminences, and present a projecting line along their whole length. *Structure*, an external cortical portion transversely cracked, and an internal woody part; the activity of the drug residing in the former. *Colour* of the exterior, yellowish or grayish-brown. *Odour*, none in the dried root, but peculiar and nauseous in the fresh. *Taste*, first sweetish, and afterwards hot and pungent.

Chem. Comp.—Besides containing gum, lignin, extractive, and resin, it owes its activity to a principle called *senegine*, or more recently, *polygalic acid*. This occurs as an inodorous white powder, possessing powerful irritant properties, when applied to the mucous membrane. It forms salts with metallic oxides.—*Form*, $C^{22}H^{18}O^{11}$(?).

Operation.—Tonic, stimulant, and expectorant, increasing also the secretions of the sweat and urine. In large doses it proves irritant and emetic.

Uses.—It may be advantageously prescribed as an expectorant in the asthenic varieties of *pulmonary inflammations*, and in the declining stage of their more active forms. At such times it is commonly conjoined with squill, and often advantageously with muriate or carbonate of ammonia: it is also well fitted for combination with bark and sulphuric acid in the last stages of *phthisis*.

Senega has been recommended by Dr. Chapman of Philadelphia, for relieving *dysmenorrhœa*, and more particularly that form of it which is accompanied by the expulsion of a false membrane, like the decidua, from the uterine cavity.

Off. Prep.—*Decoctum Senegæ. U. S.* (Senega, ℥j., distilled water, Ojss., boiled down to Oj., and strained.) *Dose*, f℥j.—iij.

[*Syrupus Senega. U. S.* Senega, bruised, ℥iv.; water, Oj.; sugar, ℔j. Boil root with the water, strain, add sugar, and form syrup. *Dose*, f℥j.—iij.]

Krameria Triandra.—The Rhatany.

Tetrandria, Monogynia.

[An under-shrub, with a long, branching root. The stem is procumbent and much branched. The leaves are sessile, oblong, covered on both sides with long silky hairs. The flowers are solitary, of dark red colour, and followed by round drupes beset with stiff reddish hairs.]

Hab.—Peru, met with in the same localities as the cinchonas.

Krameria. U. S. (*Radix.*) L.

Description.—*Form*, a root-stock, and several long cylindrical roots. *Thickness*, from that of a writing quill upwards. *Structure*, an external rather fibrous bark, and a woody centre. *Colour* of the exterior, dark reddish-brown; of the interior, yellowish-red. *Taste*, bitter and astringent.—The middle-sized and smaller pieces are to be preferred, as possessing a greater proportion of the bark, in which the astringency principally resides.

Chem. Comp.—Besides containing lignin, mucilage, etc., analysis displays a very large quantity of *tannic acid*,—nearly forty per cent.; and also a peculiar acid, called *krameric*, to which styptic properties have been ascribed.

Chem. Rel.—An infusion of the root reacts like a solution of tannic acid; and, accordingly, cannot be prescribed in conjunction with substances incompatible with that acid.

Oper. and Uses.—A pretty powerful astringent, suited to most

of the purposes for which vegetable astringents are commonly employed. It is also used as a dentifrice.

Dose.—℈j.—ʒij.

Off. Prep.—*Infusum Krameriæ. L. U. S.* (Rhatany-root, ℥j., macerated in boiling distilled water, Oj., and strained.) *Dose,* f℥j.—ij.

[*Extractum Krameriæ. U. S.* Prepared like Extract of Gentian. *Dose,* grs. x.—℈j.

Tinctura Krameriæ. U. S. Powdered rhatany, ℥vj.; diluted alcohol, Oij. Macerate and strain. *Dose,* ʒj.—ij.

Syrupus Krameriæ. U. S. Extract of rhatany, ℥ij.; water, Oj.; sugar, ℔ijss.—*Dose,* fʒj.—f℥ss.]

LINACEÆ.

Linum Usitatissimum.—The Flax-plant.

Pentandria, Pentagynia.

A very common annual plant, with a tallish, smooth, and delicate stem, and small acute lanceolate leaves, distantly arranged upon it, sessile and alternate. The flowers are arranged in a corymbose panicle, largish and blue.

Lini Semina. L. Linseed.

Linum. U. S.

Lini Oleum. (*Oleum e seminibus expressum. L.*)

Description of the Seeds.—*Form,* oval, flattened at the sides, and with one extremity pointed. *Exterior,* smooth and glossy. *Structure,* an envelope, which yields mucilage to hot water, and an oily nucleus.

Prepar. of the Oil.—The seeds are simply expressed without heat: the marc is commonly known as *oil-cake,* being used for fattening cattle, and when powdered, constitutes *linseed meal.*

Chem. Comp.—Linseed owes all its useful medicinal properties to containing *mucilage* and *fixed oil.* This oil consists chiefly of

oleine or oleate of glycerule, containing, however, a little *margarine* dissolved in it: it is one of those to which the term *drying* has been applied, since it becomes converted, by exposure, into a kind of varnish.

Oper. and Uses.—Linseed is employed for making a mucilaginous and demulcent infusion, fitted for use in *catarrhal affections* and inflammatory states of the mucous membranes.—The oil forms a valuable application to *burned* or *scalded parts*, either alone, or combined into a soap with lime-water. It is sometimes used in a demulcent clyster in *dysentery*.—Linseed meal is commonly employed in the preparation of poultices, for application to inflamed and suppurating parts.—The use of poultices in surgical practice has been, in great measure, abandoned for the more cleanly application of the *water-dressing;* but still there are many circumstances where this substitution cannot be made with equal advantage.

Off. Preps.—*Infusum Lini Compositum. L. Infusum Lini. U.S.* (Bruised linseed, ʒvj., [ʒss., U. S.], and liquorice-root, ʒij., macerated in boiling distilled water, Oj., and strained.) *Dose, ad libitum.*

Cataplasma Lini. L. (Powdered linseed mixed with boiling to a fit consistence.)

MALVACEÆ.

Malva Sylvestris.—The Common Mallow.

Monadelphia, Polyandria.

A perennial herb, with a strong branched stem, and rounded 5 to 7-lobed leaves unequally serrated. The stem, petioles, and flower-stalks are hairy. The flowers are axillary, 3 or 4 together, large and purple, having usually 3 little hairy bracts next to the calyx.

Hab.—Europe.

Malva. L.

The whole plant is officinal and abounds in *mucilage*, on account of which it is introduced into the Materia Medica as a demulcent.

Off. Prep.—*Decoctum Malvæ Compositum. L.* (Dried mallow, ℥j., and chamomile, ℥ß., boiled with water, Oj., and strained.) It is used as a clyster in dysentery, and as a fomentation in external inflammations.

Althæa Officinalis.—The Marsh Mallow.

Monadelphia, Polyandria.

The general aspect of this plant is very similar to the mallow. Its whole surface, however, is exceedingly soft and downy; the leaves 3 or slightly 5-lobed, the lobes being more acute and with sharp denticulations. The calyx also has not 3, but from 6 to 9 bracts, as an involucel below it.

Althææ Folia.—Althææ Radix. L.

Althea. U. S.

Description of the Root.—*Form*, long, cylindrical, and branched. *Thickness*, about that of the finger. *Colour*, epidermis externally yellowish-brown; the interior of the root, white. *Odour*, feeble. *Taste*, sweet and mucilaginous.

Chem. Comp.—It contains a large quantity of *mucilage* and *starch*, the former being soluble in cold, the latter in boiling water. In addition to these, it contains 2 per cent. of a crystallizable principle called *altheine* or *asparagine*, whose formula is $C^8H^8N^2O^5$, which, from the similarity of its composition to theine and caffeine (principles contained in tea and coffee), may exert a beneficial action upon the animal economy.

Oper. and Uses.—Demulcent, its *decoction* being used as the *infusum lini*.

Off. Prep.—*Syrupus Althææ. L.* (Marsh Mallow root, ℥viij., boiled with water, Oiv., and sugar, ℔iiss., into a syrup.) *Dose*, f℥j.—f℥ss. A preparation sometimes administered to children.

[MELIACEÆ.

Melia Azedarach.—Pride of India.

Decandria, Monogynia.

A middle-sized tree, with spreading branches, and large

alternate, bipinnate leaves, each pinnule with five to seven, opposite, lanceolate, acute leaflets. The flowers are odorous, of a light violet or pink colour, forming a panicle arising from the axils of the upper leaves. The fruit is a drupe, about as large as a cherry, and containing an elongated nut, which is five-celled and five-seeded.

Hab.—Many parts of Asia, naturalized in the Southern and Southwestern States.

Azedarach. U.S.—(*Radicis cortex.*)

Description.—Inner bark of root, in a fresh state. *Colour*, yellowish-white. *Odour*, unpleasant, virose. *Taste*, bitter and nauseous.

Chem. Comp.—No correct chemical examination of the Azedarach has been made; from the imperfect analysis of Dr. Duvall, it would appear that the active principle is soluble both in water and alcohol.

Oper. and Uses.—It is anthelmintic, narcotic, and in large doses emetic. From the testimony of many practitioners, it appears to be an exceedingly useful vermifuge, but requires some caution in its administration, on account of its narcotic powers. The leaves are stated to be astringent and tonic, and the berries furnish an oil which is also anthelmintic, and is useful in chronic cutaneous affections.

Dose.—Powder, grs. xx.—Decoction made with ℥iv., of bark to quart of water. *Dose*, ℥ss., at intervals.]

AURANTIACEÆ.

Citrus Aurantium.—The Sweet Orange Tree.

Polyadelphia, Polyandria.

A handsome evergreen tree, several feet in height. The leaves are alternate and smooth, with an oval acute lamina articulating with a winged petiole. Its well-known flowers are large and white, the stamens having their compressed filaments united at

the base into 3 or more groups. The pulp of the fruit is sweet, and the rind contains convex vesicles of oil.

Aurantium (*Fructus*).—Aurantii Flores.—Aurantii.

Oleum (*Oleum e floribus destillatum*). *L.*

These require but little further description. The sweet orange, when ripe, is a well-known fruit, containing a sweet and juicy pulp: when unripe and small, the berries are collected and dried, and after being rounded in a lathe, are sold in the shops as *issue peas.* The flowers are used for preparing the oil and the aqua florum aurantii. The principal use of the oil is for the extemporaneous preparation of the distilled water.

Off. Prep.—*Aqua Florum Aurantii. L.* (Prepared by distilling orange-flowers, ℔x.; with water, *cong.* ij.; and some proof spirit, f℥vij.) Orange-flower water is merely used as a vehicle for other remedies.

Citrus Vulgaris.—The Bitter Orange Tree.

Polyadelphia, Polyandria.

In most points this species agrees with the last, differing from it in the bitter and acid nature of the ripe fruit, and in its rind being much rougher, with concave vesicles of oil.

Aurantii Cortex. U. S. (*Fructûs cortex exterior.*) *L.*

Description.—The rind of the fruit, which is the only part the London College makes officinal, is used both in a fresh and dried state, the white internal part being previously removed. It has a powerful grateful odour and bitter taste.

Chem. Comp.—It contains a *volatile oil,* having a formula similar to that of oil of lemons ($C^{10}H^{8}$), a trace of *gallic acid,* and, in addition, a *bitter extractive* matter, concerning the nature of which little is known.

Oper. and Uses.—An agreeable aromatic tonic, suited for administration in atonic *dyspepsia,* and, when given in the form of infusion, as a vehicle for other medicines.

Off. Preps.—*Infusum Aurantii Compositum. L.* (Bitter orange-peel, dried, ʒss.; fresh lemon-peel, ʒij.; and bruised cloves, ʒj.; macerated in boiling distilled water, Oj., and strained.) *Dose*, fʒj.—ij.

Tinctura Aurantii. L. (Dried orange-peel, ℥iijss.; macerated in proof-spirit, Oij., and strained.) *Dose*, fʒj.—iij.

Syrupus Aurantii. L. E. (An infusion of fresh orange-peel, ℥ijss.; made into a syrup with sugar, ℔iij.; and boiling water, Oj.) *Dose*, fʒj.—iij.

Confectio Aurantii. L. Confectio Aurantii Corticis. U.S. (Fresh orange-peel, ℔j., separated by a rasp, beaten into a confection with sugar, ℔iij.) Used as a vehicle for more active medicines, such as the sesqui-oxide of iron, etc.

Citrus Limonum.—The Lemon Tree.

Polyadelphia, Polyandria.

The Lemon tree differs from the two former species of Citrus, in not having the petiole winged, and in the oval form of the fruit, its thick rugose rind, and very acid pulp.

Limones (*Fructus. L.*)—Limonum Cortex. (*Fructûs cortex exterior. L.*)—Limonum Oleum. L. U. S. (*Oleum e fructûs cortice exteriori destillatum. L.*)—Limonum Succus. L.—Limonis Cortex. U. S.

Description.—The *rind* is of a light yellow colour externally but becomes browner when dried. It possesses a fragrant odour, and a warm, bitter, aromatic taste, which is destroyed in part by drying. The *juice* obtained by squeezing and filtering, is slightly turbid and very acid, with some aromatic flavour. It is commonly preserved by the addition of brandy or spirit of wine. The *oil* is colourless and limpid, possessing the odour of the peel, and a hot taste, agreeable when diluted. It is sometimes prepared by rasping off the yellow portion of the rind, and submitting it to pressure. A less pure oil, and one liable to change on keeping, is thus obtained; distillation with water being a much preferable method.

Chem. Comp.—1. Of the rind. It contains *volatile oil*, a *bitter extractive*, and a trace of *gallic acid*. The white portion contains a crystallizable principle called hesperidine.—2. Of the juice. It owes its medicinal properties chiefly to the possession of *citric acid;* but it contains also *malic acid*, *gummy*, and *extractive* matters.

Oper. and Uses.—1. Of the *rind*.—An agreeable addition to tonic mixtures and demulcent drinks, removing the insipidity which often disgusts a patient in the employment of the latter.

2. Of the *oil*.—Stimulant, like other volatile oils, but chiefly used for the purpose of imparting an agreeable odour to ointments, liniments, etc.

3. Of the *juice*.—The chief therapeutical value of lemon-juice, is for the cure of *scurvy*, a disease much more common formerly than at present, and apparently due to a defective supply of vegetable food, whether at sea or on land. Several fruits and vegetable juices have been believed antiscorbutic, but this carries the palm above them all; and accordingly, under the present naval regulations, every seaman is provided daily with a fluid ounce of it, as a preventive of the disease. It has also other minor uses, such as the formation of *lemonade*, and of refrigerant *effervescing draughts*, with the addition of an alkali.

Off. Prep.—*Syrupus Limonum. L. E. Syr. Limonis. U.S.* (Strained lemon juice, Oj., made into a syrup with sugar, ℔iiss. ℔ij., U.S.) *Dose*, f℥j.—iv.

[*Liquor Potassæ Citratis. U.S.* Fresh lemon juice, Oss.; carbonate of potash, q. s. to saturate, and filter. *Dose*, ℥ss.]

Citric Acid.

Prep.—*Boiling lemon juice* is directed to be saturated with *chalk*, when carbonic acid is given off, and an insoluble citrate of lime formed. This is washed with tepid water, and decomposed by boiling with *dilute sulphuric acid:* sulphate of lime is formed, which is insoluble, and citric acid remains in solution, and crystallizes on evaporation.

Prop.—When pure, citric acid occurs in the *form* of regular rhomboidal prisms, terminated by four faces. It is very soluble in water and alcohol, and the aqueous solution decomposes by

keeping.—*Formula*, $3\,HO,\ C^{12}H^{5}O^{11}+2\,HO$.—It is a *tribasic* acid, and, in the formation of the citrates, one or more of its basic atoms of water may be replaced by another base. Citric acid is decomposed by heat, with formation of an acid found also in the Aconitum napellus, and called *Aconitic acid.*—*Tests.* It forms insoluble white precipitates with the soluble salts of *lead, baryta*, and *silver*, and the citrate of silver, when heated, froths up, becomes brown, and deflagrates, leaving a gray residue of metallic silver.

ADULTERATION.—Citric acid is often adulterated with *tartaric acid*, and also with the *citrate of lime*. The first of these can be *detected* by the addition of small quantities of carbonate of potash, when an insoluble bitartrate of potash will be produced on stirring; the second, by neutralizing with ammonia, and subsequently testing with oxalate of ammonia, which, if lime be present, will precipitate an insoluble oxalate of that earth.

OPER. AND USES.—Citric acid may be used in all the cases for which lemon juice is indicated, whether as a cure for scurvy, or for the formation of effervescing draughts. The quantity required to saturate 20 grains of the ordinary alkaline carbonates, is as follows:—

Carbonate of Soda . .	$9\frac{3}{4}$ grs. of Cit. Ac. or		fʒiiß	of Lem. Juice.
Bicarbonate	17	——	fʒß	——
Carbonate of Potash . .	17	——	fʒß	——
Bicarbonate	14	——	fʒiijß	——
Sesqui-carb. of Ammonia	24	——	fʒvj.	——

CITRUS LIMETTA BERGAMIUM.—The Bergamot Citrus.

Polyadelphia, Polyandria.

Hab.—South of Europe.

BERGAMII OLEUM (*Oleum e fructûs cortice destillatum.*) *L.*

OLEUM BERGAMII. U. S.

Bergamot oil is procured from the rind of the fruit, either by expression, or, as the London College states, by distillation with

water. Its *formula* stated on the C^5H^4 type is $6\ C^5H^4+2\ HO$. It is merely *used* as perfume.

GUTTIFERÆ.

Hebradendron Cambogioides.—The Gamboge Tree.

Monœcia, Monadelphia?

[A tree of moderate size, with opposite, obovate, elliptical, petiolate leaves. The male flowers in axillary fascicles; female unknown. Fruit, a berry, about the size of a cherry, with a firm reddish-brown external coat, and sweet pulp. Seeds reniform, elliptical.]

Hab.—Siam. The London Coll. refers gamboge incorrectly to the *Stalagmitis cambogioides*, no such tree existing.

Cambogia. L. (*Gummi-resina.*)

Gambogia. U.S.

Description.—The only gamboge imported into this country is obtained from Siam, that made in Ceylon being too coarse for English commerce. Siam gamboge occurs in two forms, viz.:—in *cylinders or pipes*, and in *cakes*. 1. Pipe Gamboge.—*Form*, hollow cylinders, frequently striated, from taking an impression of the interior of the bamboo stems into which it had been run. *Size*, three-quarters of an inch to two inches diameter. *Colour*, greenish-yellow exteriorly. *Fracture*, conchoidal, smooth, brownish-yellow and glistening. *Taste*, slight, but soon producing a sensation of acridity in the throat. The *colour of the powder* is a bright yellow.

2. Cake Gamboge.—*Form*, in masses, much inferior in point of purity to the former kind, but otherwise presenting most of its characters.

Prep.—It is obtained by making incisions into the bark or slicing it; the juice which exudes is collected and hardened in the sun. This is the method employed in Ceylon; and it is probable that the same is used in Siam.

Chem. Comp.—Gamboge consists of about 70 per cent. of a

resin, and the remainder is *gum*, with a trace of woody fibre and *starch*, and a little water.—The *resin*, as usual, is acid, and is called *gambogic acid*. It occurs as a reddish translucent mass, which forms a yellow powder. *Formula*, $C^{40}H^{23}O^{8}$. It is soluble in alcohol or ether, and is precipitated from its alcoholic solution by water. It forms soluble salts with the alkalies, and insoluble ones with most of the metallic oxides.

Chem. Rels.—Rubbed with *water*, gamboge forms a yellow emulsion, from the gum dissolving, while the resin remains suspended; *potash* or *alcohol* causes the solution to become clear. *Salts of lead* form yellow precipitates in the solution.

Operation.—Gamboge is well known as a drastic and hydragogue cathartic, frequently griping severely, and giving rise to some degree of vomiting. In considerable doses, it proves highly irritant to the stomach, occasioning a more or less inflammatory condition of the lining membrane of the alimentary canal.

Uses.—Combined with aloes and ginger, which are found to modify its operation, it is a useful purgative in many of the ordinary forms of *constipation*. Gamboge is also sometimes conjoined with cream of tartar, as a hydragogue in *dropsy*.

Dose.—Grs. j.—iv.

Off. Prep.—*Pilulæ Cambogiæ Compositæ*. L. (Bruised gamboge, ʒj., aloes, ʒjss., and ginger, ʒss., beaten into a mass with soap, ʒij.) *Dose*, grs. v—xv.

Canella Alba.—The Laurel-leaved Canella.

Decandria, Monogynia.

[A middle-sized tree, with alternate, shining, obovate leaves, which are coriaceous, and rigid when old, transparently dotted when young. Flowers small, purple, in clusters: these are succeeded by smooth, fleshy, blue or black berries, about as large as a pea.]

Hab.—West Indies and continent of America.

Canella. U. S. (*Cortex.*) L.

Description.—*Form*, in quills and sometimes flat pieces. *Size*, 5 to 8 inches in length, the quills about an inch in diameter. *Co-*

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lour of the exterior, a pale-yellowish white; of the interior, still lighter. *Fracture*, granular. *Taste*, bitterish, aromatic and pungent.

Chem. Comp.—Besides woody fibre, starch, gum, extractive, salts, etc., canella bark contains a *volatile oil*, and an *aromatic resin*, to which it owes its medicinal properties. A *crystallizable sugar*, resembling mannite, has also been found in it.

Chem. Rels.—It is distinguished from Winter's bark by *not* containing tannic acid or sulphates, and, consequently, by the infusion *not* precipitating the *salts of iron* or *baryta*.

Oper. and Uses.—An aromatic tonic, employed advantageously in some cases of *atonic dyspepsia*.

Dose.—Grs. x—ʒß.

VITACEÆ.

Vitis Vinifera.—The Vine.

[A very variable, shrubby plant, with prostrate or climbing branches, furnished with tendrils opposite to each footstalk. Leaves very variable. A vast number of varieties have been cultivated, differing from each other in foliage and fruit.]

Pentandria, Monogynia.

Hab.—Cultivated in Europe, Asia, etc.

Uva (*Baccæ exsiccatæ, demptis acinis*). *L.*

Uva Passa. U. S.

Prep.—Raisins are prepared either by simply drying the grapes in the sun, or steeping them previously in an alkaline ley.

Commer. Source.—The medicinal raisins are imported from Spain and the Levant. The finest are the muscatel.

Chem. Comp.—They contain a large quantity of *sugar* identical with starch sugar, and *bi-tartrate of potash*, to which they owe any medicinal properties they may possess. They contain also a little citric and malic acid.

Oper. and Uses.—Raisins are nutritive, and have been recommended as a principal article of diet for *consumptive* patients,

alternating their use with that of milk, and employing at the same time an occasional emetic. Ripe grapes may be used in the same manner. They are introduced into some officinal preparations with a view to improve their flavour.

Vinum (*Wine*).

Manufacture of Wine.—The juice expressed from grapes when fully ripe is denominated *must*, and contains, besides *grape sugar*, malic acid and bi-tartrate of potash, a *nitrogenized substance* to which its power of undergoing spontaneous fermentation is due. This process soon sets in when the *must* is exposed to the air, the nitrogenized substance or ferment undergoing decomposition, and the sugar simultaneously becoming converted into alcohol and carbonic acid: the liquor at the same time rises in temperature, becomes muddy, and assumes a vinous odour. When either all the ferment has been altered and separated, from its insolubility in alcohol, or all the sugar contained in the juice decomposed, the action ceases; and, according as the must contains one or other of these principles in excess, the wine remains sweet, or its alcohol has a disposition to undergo further change, from the progressive oxidation of its nitrogenized constituent. The altered ferment now subsides, in the form of yeast, and the wine becomes clear. Where the must has been poor in sugar, it is important to prevent the subsequent acidification of the wine, which would inevitably accompany the further absorption of oxygen by the nitrogenized matter remaining in it; and for this purpose the process of *sulphuring* is had recourse to. This is effected by burning sulphur in the casks into which it is to be racked, when the sulphurous acid formed becomes absorbed by the wood in its interior. On introducing the wine after this, any oxygen it has acquired in the transfer is removed, by the greater affinity which the sulphurous acid has for it; and, as air penetrates through the pores of the wood, all further absorption of oxygen is prevented, by this acid taking precedence in combining with it. When kept, the wine deposits on the interior of the cask, in the form of a crust, the bi-tartrate of potash it contains, mixed with the extractive and colouring matter: this constitutes argol, noticed before as the source of cream of tartar.

Although *sherry* wine (Vinum Xericum) is the only one admitted as officinal by the British Colleges, other wines in ordinary use are also employed medicinally. All, however, though differing in shade and colour, as well as in flavour and *bouquet*, are distinguished by the possession of the *vinous odour*. *Cape* wine is commonly employed for the preparation of the officinal wines, in place of the sherry directed for use by the Pharmacopœia.

Chem. Comp.—The several varieties of wine contain from about 10 to 25 per cent. of *alcohol* (sp. gr. 0·825), on which its intoxicating power in great measure depends; while it owes its characteristic odour to the presence of *œnanthic ether*, a volatile liquid composed of œnanthic acid and ether.—*Œnanthic ether* constitutes $\frac{1}{40000}$th part of wines; and may be obtained as an oily liquid by distilling the lees of wine, and purified from free acid by redistilling over about $\frac{1}{4}$th of it. It preserves a strong vinous odour, and readily dissolves in alcohol and ether, but not perceptibly in water. Boiled with caustic potash, it acts like other salts of ether; and, while alcohol may be distilled over, a compound of the œnanthic acid with the potash is formed.—*Œnanthic acid* may be obtained from the last-mentioned salt, by removing the potash by another acid; and, when subsequently washed and dried, it appears as a substance of the consistence of butter, having neither odour nor taste, and capable of forming salts, like the other fatty acids.

The peculiar *bouquet* of individual wines, by which each may be recognised, is not dependent upon œnanthic ether, but upon another *principle which is not volatile*, and which most possess in a greater or less degree, but some not at all.—Wines contain also variable qualities of *free acids, sugar, bi-tartrate of potash*, and *tannin*, as well as *colouring* and *extractive matters*.—The *free acid* consists chiefly of the *malic, citric*, and *tartaric*, and is found in greatest quantity in the Rhenish wines, which are termed *light and dry*.—The *sparkling* wines, of which champagne affords the best example, owe this property to a large accumulation of *carbonic acid*, which takes place in them after bottling.—The *sweet wines*, such as *Malaga* and *Frontignac*, contain undecomposed sugar; the *must* having been richer in this ingredient than in nitrogenized matter, and the process of fermentation having been consequently defective. The bi-tartrate of potash, extractive and

colouring matters have been already adverted to, as depositing in the interior of the cask. In the wines of the Upper Rhine, the *bi-racemate of potash* more or less replaces the bi-tartrate, racemic and tartaric acids being isomeric. *Tannic acid* is found in some of the red wines, being apparently derived from the skin of the grapes, or from their seeds.

Operation.—The effects of wine upon the system call for but little description. They resemble very closely those of spirit; but it appears to exhilarate the mind much more than the latter, before its intoxicating operation is manifested. Wines, however, do not possess intoxicating powers in exact proportion to the amount of alcohol they contain, something seeming to depend on the carbonic acid they evolve, and other principles which they respectively possess. Hence it is that champagne intoxicates so speedily, as it is well known to do; while these effects more rapidly subside than when occasioned by a larger quantity of other wines.

Uses.—Wine is not only employed pharmaceutically, as a solvent for the active principles of some drugs, but is also prescribed in disease, either as an article of diet, or with a view to its excitant operation in asthenic conditions of the system. In some cases of atonic dyspepsia, a mild stimulant of this nature very much assists the digestive process, when either taken with the principal meal, or immediately after it. For this, as well as for other medicinal purposes, the stronger wines are preferable; and of these sherry is the most useful, on account of the small quantity of free acid in its composition.—Wine is equally if not more important, as a general stimulant, to counteract the *asthenia* which accompanies inflammatory and febrile diseases; a state most remarkably exhibited in the present epidemics of *continued fever*. However, it should not be resorted to, unless the system appears unable to bear up against the disease, and manifests a disposition to "sinking;" and even then its effects require to be most carefully watched, and its use continued or intermitted, according as it produces a favourable or unfavourable action upon the circulating and nervous functions. "The best indications for wine," in fever, "are a soft and not jerking pulse, a tongue without much yellow or white coating, a temperature not particularly elevated, paleness, or at least diminished flushing of the face, the

absence of local inflammation, and a drowsy torpor, without either high delirium, or, on the other hand, profound coma. The opposite signs are not always contra-indications; but, when any of them are present, wine is not so certain a remedy; and some of them imply preliminary or contemporaneous treatment of another kind. A small wiry or full hard pulse is commonly a positive contra-indicant. So, too, are a very foul loaded tongue, considerable elevation of temperature, smart local inflammation, much flushing of the face, with heat of the head, pulsation of the temporal arteries, and other symptoms of cerebral determination of blood. High delirium and deep coma are not always contra-indicants, as they may arise from excess of depression; but they are sometimes associated with obvious determination towards the head, or congestion of the brain; and in that case, stimulants should be avoided for a time, or more frequently, treatment by general stimulants should be combined with local treatment by leeches, cold, and blisters." (*Christison*, art. *Continued Fever*, in the *Library of Medicine.*)—In *local inflammations*, the state of the general system must, in like manner, be our guide for the administration of wine. Many diseases, such as pneumonia, closely resemble typhus in their general characters; and careful examination of the patient is often necessary to form the diagnosis between them; others, again, like erysipelas, have a disposition, especially in London and crowded towns, not only to occur in debilitated subjects, but to run into a typhoid form; while other fatal affections might terminate favourably, could the powers of the system be upheld for a sufficient length of time to allow of the subsidence of diseased action, or the expulsion of morbid products. In all these cases, as well as where the debility is due to defective nourishment, misery, etc., the cautious employment of wine may be productive of the most gratifying results. It is hardly necessary to remark upon its use in *syncope*, and other allied instances of temporary *defective action* in the heart and nervous functions; for which any diffusible stimulant may be prescribed as a restorative. As an ordinary article of diet, wine has been in use from very early ages; and, partaken of in moderation, is often rather beneficial than injurious for the artificial state of society in which we live.

OXALIDACEÆ.

Oxalis Acetosella.—The Wood Sorrel.

Decandria, Pentagynia.

A pretty little plant, growing in shady places, as on the edges of our woods and plantations, and flowering early in the summer. Its leaves are ternate and radical, the leaflets being inversely heart-shaped. The solitary white flowers are placed at the extremity of a long radical scape, and are beautifully veined with purple.

Hab.—Both in Europe and the United States.

Acetosella. L.

The whole plant is officinal, having an agreeable acidulous aste, depending on *bin-oxalate of potash* contained in the juice.

Oper. and Uses.—It is rarely used now, except for the purpose of making a whey when boiled with milk, which constitutes a pleasant refrigerant drink in fever.

ZYGOPHYLLACEÆ.

Guaiacum Officinale.—The Officinal Guaiacum.

Decandria, Monogynia.

This is an evergreen tree, growing to the height of about 40ft., with a crooked stem and knotted branches. The leaves are abruptly pinnated and bi-jugate. The flowers, which are of a blue colour, are clustered, with long peduncles in the axils of the upper leaves.

Hab.—The West Indian islands, especially St. Domingo and Jamaica.

Guaiaci Resina. E. U.S.—(*Resina.*) L.

Description.—*Form*, sometimes in oval tears, but mostly in

masses of varying size, containing chips of wood and similar impurities. *Colour*, greenish-brown; thin fragments being somewhat translucent. *Consistence*, brittle. *Fracture*, splintery and vitreous. *Odour*, balsamic, and becoming more obvious on pulverization. *Taste*, slight, being followed by a burning sensation in the throat.

Prep.—The usual mode in which the resin is obtained, is by boring a hole lengthwise through a billet of the wood, and thrusting one end into a fire: the heat drives out the resin, which is collected at the depending extremity. Another is boiling the chips in salt and water, and skimming off the resin which rises to the top. It is also said to exude naturally, or from wounds made in the stem.

Chem. Comp.—Gum guaiacum, when pure, consists of a peculiar acrid *resin* called *guaiacic acid*, which is commonly mixed with some extractive matter soluble in water, and impurities. Guaiacic acid possesses all the chemical properties of ordinary resins.—*Formula*, $C^{40}H^{23}O^{10}$.—Probably guaiacum resin contains two isomeric acids, distinguished by their different solubility in ammonia.

Chem. Rel.—It is *soluble* in alcohol and rectified spirit, the resin being precipitated on addition of *water*. *Nitric acid* and *spirit of nitric ether* change the colour of the resin to blue and brown.

Adulteration.—*Common resin* is an ordinary adulteration. It can be *detected* by the odour evolved when heated; and, when the tincture is precipitated by water, and redissolved by solution of potash, by an excess of the alkali again precipitating it.

Operation.—Stimulant and diaphoretic, and when not increasing the secretion of sweat, augmenting that of the urine. It appears also to act specifically in some degree upon the mucous membranes, lessening excessive secretion from their surfaces.

Uses.—In the *cold* form of *chronic rheumatism*, where the pains are relieved by warmth, guaiacum is a highly valuable remedy; but where the opposite obtains, and where warmth aggravates suffering, while the application of cold allays it antiphlogistic treatment is rather indicated. It is much less useful in *gout*. When *excessive secretions from mucous membranes* are connected with rheumatic pains, we have found guaiacum

highly serviceable in lessening them; examples of this occur in the case of chronic bronchitis and leucorrhœa. In *dysmenorrhœa* it has been recommended by Dr. Dewees and Dr. Locock, being especially fitted for relieving that form of painful menstruation which accompanies a rheumatic condition of the system. It is also believed to prove serviceable in some *chronic cutaneous affections.*

Dose.—Grs. x.—ʒß.

Off. Preps.—*Mistura Guaiaci. L.* (Guaiacum, ʒiij., rubbed with sugar, ʒss., and suspended in cinnamon water, f℥xix., by means of mucilage of acacia, fʒss.) *Dose,* fʒß—ij.

Tinctura Guaiaci. L. E. U. S. (Guaiacum resin, ʒvij., dissolved in rectified spirit, Oij.) *Dose,* fʒj.—ij.

Tinctura Guaiaci Composita. L. E. U. S. (Guaiacum resin, ʒvij. [ʒiv. U. S.], dissolved in aromatic spirit of ammonia, Oij. [Oijss. U. S.]) *Dose,* fʒj.—ij.

Guaiaci Lignum. U. S. (*Lignum.*) L.

Description.—It is imported in the *form* of billets, deprived of their bark, and consisting of a greenish-brown duramen or heart-wood, and a broad grayish-yellow alburnum external to it. In the shops, however, it is met with in the *form* of turnings, having an acrid aromatic *taste.*

Chem. Comp.—It contains besides other ordinary ingredients, *resin* and *bitter extractive.*

Oper. and Uses.—It is similar in its mode of action to the resin, being stimulant and diaphoretic. It is employed also in *chronic rheumatism,* and is also supposed of service in some *scrofulous, cutaneous,* and *syphilitic* affections. It may be administered in the form of decoction.

RUTACEÆ.

Ruta Graveolens.—The Common Rue.

Decandria, Monogynia.

This shrub, commonly cultivated in gardens, never arrives at any considerable height; and the stem is woody only in its

lower part. The leaves are glaucous and compound, the terminal leaflet being obovate. It has yellow and corymbose flowers, and the whole plant possesses a powerful and most disagreeable odour.

Ruta. U.S. (*Folia.*) L.

Description.—The leaves are known both by their form and odour; and they have a bitter, acrid, disagreeable *taste.*

Chem. Comp.—Rue owes its activity to a *volatile oil*, besides which, it contains a *bitter extractive* matter, and the ordinary constituents of leaves.—*Oil of rue*, obtained by distillation, is of a yellowish-green colour, sp. gr. 0·837, and possesses in a high degree the powerful odour and acrid taste of the herb.—*Formula*, $C^{28}H^{14}O^{3}$.—Hydrochloric acid has no action upon it.

Operation.—It is stimulant, antispasmodic, and emmenagogue, and, like other powerful remedies of the same nature, gives rise, in large doses, to symptoms of narcotico-acrid poisoning.

Use.—It is perhaps less employed in scientific practice than its energetic powers would imply. Injections of rue are, however, highly serviceable in *flatulent colic*, especially as occurring in children and hysterical patients; and the emmenagogue operation of the remedy is said to be equally powerful.—The oil is the most convenient form for internal use.

Off. Prep.—*Confectio Rutæ. L.* (Dried rue, caraway, bay-berries, each, ʒiss., sagapenum, ℥ss., and black pepper, ʒij., are ordered to be rubbed into a fine powder, and to be mixed with honey, ℥xvj, when about to be used.) *Dose*, ℈j.—ʒj.

The volatile oil of rue may be given in doses of ♏iij.—v.

Barosma Crenata.

Pentandria, Monogynia.

A small upright shrub, with ovate leaves on short petioles; they are minutely crenated and glandular at the margin, and dark green upon the upper surface. The flowers are pink and terminal, on short leafy branches.

Hab.—The Cape of Good Hope.—The London College calls this plant *Diosma crenata.*

Diosma. U. S. (*Folia.*) L.—Buchu.

Description.—In addition to the description above given, the leaves must be described as having a coriaceous *consistence*, a strong *odour*, variously compared to pennyroyal, cumin, etc., and an aromatic *taste*.

Chem. Comp.—Buchu contains a *volatile oil*, *resin*, *bitter extractive*, and the ordinary constituents of leaves. The *volatile oil* is lighter than water, and possesses the peculiar odour of the plant. The *extractive* is soluble in water, and is accordingly contained in the infusion.

Oper. and Uses.—Stimulant, tonic, and diuretic, exercising, like pareira brava, a specific influence over the mucous membrane of the *bladder*, and checking the excessive secretion which accompanies its *chronic inflammation*, and at the same time diminishing the inordinate irritability of the organ.

Dose.—Of the powdered leaves, ℈j.—ʒß.

Off. Prep.—*Infusum Diosmæ. L.* (Diosma, ℥j., macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥j.—ij., frequently.

Galipea Cusparia.

Diandria, Monogynia.

[A large tree with trifoliate leaves nearly two feet long, and of an agreeable odour. The flowers are white, in large racemes, and have two fertile and three sterile stamens, and anthers with two appendages, and the style crowned with a 5-grooved stigma.

Hab.—The forests of tropical America. The U. S. Pharmacopœia, on the authority of Dr. Hancock, attributes the Angustura bark to the *G. officinalis*, a small tree, whose leaves have the odour of tobacco, and whose flowers have two fertile stamens and five sterile ones; and whose style is crowned with a simple stigma.]

Cusparia (*Cortex*). L.

Angustura. U. S.

Description.—*Form*, flat pieces and quills, often slightly bent. *Size*, 2 to 8 inches in length. *Colour* of the epidermis, grayish-yellow, the surface being unequal; of the inner surface, brownish, separable into laminæ. *Consistence*, light, and easily broken. *Fracture*, resinous. *Odour*, peculiar and disagreeable. *Taste*, bitter, aromatic and acrid.

Chem. Comp.—It contains a trace of *volatile oil*, *resin*, and a *crystallizable substance*, called Cusparin. *Cusparin* is little soluble in water, but more so in alcohol, insoluble in ether and the volatile oils. Its solutions are precipitated by tannic acid.

Adulteration.—Angustura bark has been at various times adulterated with the bark of the *strychnos nux vomica*(?), whose properties are similar to those of the well-known seeds of the plant.—*False angustura*, as it is termed, may be distinguished from the true: 1st, by its greater *density*, and by the difficulty with which it is broken; 2d, by its *outer surface* being covered with a loose rust-coloured layer, or having whitish and prominent spots variously scattered over it; 3d, by its *greater bitterness;* 4th, by its *inner surface not* being separable into laminæ, and by being changed to a bright red colour on touching it with nitric acid.

Oper. and Uses.—An excellent aromatic tonic, employed advantageously in some forms of dyspepsia, etc. Its value is in some measure enhanced, by its having no tendency to confine the bowels.

Dose.—Of the powdered bark, grs. x.—ʒss.

Off. Prep.—*Infusum Cuspariæ. L. Infusum Angusturæ, U.S.* (Bruised cusparia, ʒv., [℥ss. U. S.], macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥j.—ij.

SIMARUBACEÆ.

Simaruba Amara.—The Bitter Simaruba.

Decandria, Monogynia.

[A tall tree, with long roots, thick stem, and alternate branches. Leaves alternate, pinnate; leaflets also alternate, two to nine pairs on each side, ovate, somewhat coriaceous. Flowers small, yellowish-white, unisexual, male and female in same panicle. Fruit, five small, ovate, black capsules, on a fleshy disk.]

Hab.—A native of Guiana and Jamaica.—The London College admits the plant under the name of *Simaruba officinalis.*

Simaruba. U. S. (*Radicis cortex.*) L.

Description.—*Form*, tough fibrous pieces, folded lengthwise. *Size* of pieces, several feet in length. *Exterior*, surface rough and warty. *Colour* of the exterior, grayish-yellow; of the interior, pale yellowish-white. *Taste*, very bitter. It is difficult to reduce to powder from its toughness.

Chem. Comp.—It contains, besides the ordinary principles in the bark of roots, a *volatile oil, resin, gallic acid,* and a crystallizable principle called *quassine.*

Oper. and Uses.—A simple tonic, employed in the same cases as quassia.

Dose.—Grs. x.—ʒß of the powdered bark.

Off. Prep.—*Infusum Simarubæ. L.* (Bruised simaruba, ʒiij., macerated in boiling distilled water, Oj., and strained.) *Dose,* f℥j.—ij.

Picræna Excelsa.

Decandria, Monogynia.

[A tall tree, sometimes attaining 100 feet in height; the leaves are pinnate, having four to eight pairs of petioles, and one odd one. The flowers are in axillary racemes near the ends of the

branches; they are small and of a pale yellowish-green colour. The fruit is a drupe, of a black colour, round and shining, attached to a fleshy receptacle.]

Hab.—Jamaica and other West Indian islands.

Quassia. U.S. (*Lignum.*) L.

Description.—It is a white wood, imported in the form of billets, but cut up into chips for use, which become of a yellowish colour on exposure. Its *taste* is extremely bitter.

Chem. Comp.—It contains a peculiar crystallizable principle called *quassine*, which forms small white prisms, very soluble in alcohol, but less so in water, and its solutions are intensely bitter. It has no alkaline reaction, and contains *no* nitrogen; both acids and alkalies augment its solubility in water.

Chem. Rel.—The infusion of quassia may be prescribed with the salts of iron and most other metallic remedies, since it contains no tannin or other substances precipitated by these salts.

Adulterations.—Other woods are sometimes substituted for quassia, and detected by the *taste*.

Oper. and Uses.—A simple tonic, of a highly valuable character, especially in *atonic dyspepsia*, for which we mostly prefer it to other vegetable tonics.

Dose.—Of the powder, grs. xxx.

Off. Prep.—*Infusum Quassiæ. L. E. U.S.* (Quassia chips, ℈ij.; [ʒij., U.S.] macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥j.—f℥iij.

RHAMNACEÆ.

Rhamnus Catharticus.—The Purging Buckthorn.

Pentandria, Monogynia.

This is a shrub, rising to the height of seven or eight feet, and having its branches terminated by spines. It has elliptical, finely-serrated leaves, presenting from four to six strong lateral nerves parallel with the margin. The flowers are yellowish-green, and

diœcious; the calyx urceolate and 4-cleft; the petals rudimentary, and the fruit a four-celled berry.

Hab.—England and many parts of Europe.

Rhamnus (*Baccæ.*) L.

Description.—*Form*, globular. *Size*, that of a pea. *Colour*, black and shining. *Section*, displays four seeds, enveloped in a green juicy parenchyma. *Odour* of the juice, disagreeable. *Taste*, nauseous, bitter, and rather acrid.

Chem. Comp.—The juice of the berries contains a *bitter substance*, which is said to possess cathartic properties.

Oper. and Uses.—A powerful hydragogue cathartic, often occasioning vomiting, griping, and thirst during its operation. It is rarely prescribed by the practitioner, though still extensively used as a domestic remedy.

Off. Prep.—*Syrupus Rhamni. L. E.* (The fresh juice of the berries, cleared by subsidence, Oiv.; and, after boiling with ginger and allspice, each, ℥vj., strained, and made into a syrup with sugar, ℔iv.) *Dose*, f℥ß—j.

TEREBINTHACEÆ.

Pistacia Lentiscus.—The Mastic Tree.

Diœcia, Pentandria.

A small evergreen tree or bush, having abruptly pinnated leaves, with about eight leaflets and a winged petiole. The racemes of the male flowers are amentaceous; those of the female, more lax. The fruit is a single-seeded drupe.

Hab.—The coasts and islands of the Mediterranean.

Mastiche (*Resina.*) L.

Description.—*Form*, in tears, more or less rounded or irregular. *Colour*, pale yellow and covered with a whitish dust from attrition; translucent. *Consistence*, brittle. *Fracture*, vitreous. *Odour* and *taste*, agreeable and aromatic.

How obtained.—Mastic either exudes spontaneously from the tree, or is obtained from transverse incisions made in the bark; some hardens on the stem, and constitutes the finest *mastic in tears;* some falls to the ground, and, gathering there a variety of impurities, forms a *commoner variety.*

Chem. Comp.—It contains a *volatile oil* in small quantity, and two kinds of *resin*, both soluble in ether, but distinguished by one being soluble and the other insoluble in alcohol; the latter is peculiar to mastic, and has been called *masticine.* This resin has the property of becoming ductile and tough when warm and moist, but is very brittle when cold.

Oper. and Uses.—It acts like the turpentines generally; but is rarely administered internally, except by being *introduced into pills*, with a view to render the operation of their active ingredients more gradual.

Pistacia Terebinthus.—The Turpentine Pistacia.

Diœcia, Pentandria.

In all essential points this tree resembles the former, but grows to a considerably larger size, and the leaves have an odd leaflet at the end.

Hab.—Syria and the Greek Archipelago.

Terebinthina Chia (*Resina liquida*). L.

Description.—*Consistence*, that of honey. *Colour*, pale greenish-yellow, with much translucency. *Odour*, terebinthinate. *Taste*, bitterish.

How obtained.—Transverse cuts are made into the trunks of the trees, and the turpentine is collected on flat stones placed below them.

Chem. Comp.—It consists of a large quantity of *resin*, dissolved in a *volatile oil*, similar to the essential oil of ordinary turpentine.

Oper. and Uses.—As the turpentines generally.

Rhus Toxicodendron.—The Poison Sumach.

Pentandria, Trigynia.

A low creeping shrub with ternate leaves, the leaflets being angularly incised and pubescent. It has greenish-white flowers, the males being arranged in short close spikes, and the females in loose panicles. The fruit is a striated berry.

Hab.—North America.

Toxicodendron. U.S. (*Folia*) L.

Description.—The leaves are the officinal part. They have an astringent and acrid taste when fresh.

Chem. Comp.—The principle which probably gives to the Rhus Toxicodendron its active properties is an *acrid resin*, of which the dry leaves contain about $\frac{2}{100}$ths; it contains also a *gummy extractive*, and a principle which becomes black and insoluble when exposed to the air or oxidizing agents.

Oper. and Uses.—The local action of the leaves or juice is powerfully irritant, causing inflammation and blistering of the parts to which they are applied. Internally, small doses prove stimulant to the spinal system, inducing twitchings and pricking sensations, with return of sensibility, in parts affected with *palsy*, its action in this respect being similar to that of strychnia. It was recommended in palsy by Dr. Alderson of Hull.

Dose.—Of the powder, gr. ß—j., gradually increased.

Boswellia Serrata.—The Olibanum Tree.

Decandria, Monogynia.

[A large tree, with the foliage crowded at the extremity of the branches. The leaves are pinnate, alternate, deciduous; the leaflets are opposite, obtuse, pubescent, and serrate. The flowers are numerous, small, of a pale pink colour, and in axillary ra-

cemes. The fruit is an oblong capsule, with three cells, each containing a single seed, which is winged.]

Hab.—Coromandel and other parts of India.

Olibanum (*Gummi resina*). *L.*

Description.—*Form*, roundish or oblong tears. *Colour*, pale yellowish; translucent within, and powdery outside. *Consistence*, brittle. *Odour*, balsamic. *Taste*, acrid and bitterish.

Chem. Comp.—It contains a *resin*, possessing properties similar to other resinous acids, *gum* and *volatile oil.*

Oper. and Uses.—As the turpentines.

Dose.—ʒß—j.

Balsamodendron Myrrha.—The Myrrh Tree.

Octandria, Monogynia.

[A small tree, seldom more than 14 feet high, with numerous, crooked, spinous branches, having buds loaded with an aromatic resin. The leaves are thinly scattered, ternate; the leaflets obovate, on short footstalks. Flowers unknown. Fruit ovate, smooth, brown, about the size of a pea. The bark is pale and gray, and the wood yellowish-white; both are aromatic.]

Hab.—Gison, on the borders of Arabia Felix.

Myrrha. U. S. (*Gummi resina. L.*)

Description of the best or Turkey Myrrh.—*Form*, in pieces of irregular shape, often tuberculated. *Size*, mostly about that of a walnut, but occurring larger or smaller. *Colour*, reddish-brown, powdery on the outside. *Consistence*, brittle; and it feels greasy when powdered in a mortar. *Fracture*, vitreous. *Odour*, aromatic. *Taste*, bitter and aromatic; adhering to the teeth when chewed.

How obtained.—Myrrh is a spontaneous exudation from the bark, and is at first of a pale yellow colour and soft, altering as it dries.

Commerce.—It is imported from the shores of the Red Sea, by way of India.

Chem. Comp.—It contains *resin*, *volatile oil*, *gum*, *salts*, etc. The *resin* constitutes 25 per cent. of the myrrh; and consists of two acids, both soluble in alcohol; but one soluble in ether, while the other is not. The *volatile oil* forms about 2½ per cent., and imparts the odour to myrrh, having a flavour somewhat like camphor.

Chem. Rel.—Rubbed with *water*, the gum is dissolved; and, by suspending the resinous matter, forms a white and opaque emulsion. *Alcohol* and *ether* take up mostly the resin and oil, which are again thrown down by addition of water. It is very soluble in *alkaline* solutions.

Adulteration.—The finest kinds of myrrh are often mixed with inferior varieties; some of which are known by being in small tears; and others by their darker colour, with weaker odour and taste. Some pieces of a gum-resin, called *bdellium*, are frequently mixed with the myrrh.

Operation.—It is stimulant, antispasmodic, and reputed emmenagogue: it appears also to possess the power of lessening excessive discharges from mucous membranes. How far its action on the menstrual function extends, we are unable to state from any experience of its use, except as conjoined with aloes.

Uses.—Myrrh is rarely used as an internal remedy, except in combination with iron or aloes; but, when conjoined with these, proves very serviceable in *atonic conditions* of the *stomach* and *intestines*, as also in the anæmic form of *amenorrhœa*. It is often employed as a *gargle*, in ulcerated and sloughing states of the throat. It appears useful also in lessening chronic discharges from the urethral and pulmonary mucous membranes.

Dose.—Grs. x.—ʒß.

Off. Prep.—*Tinctura Myrrhæ. L. E. U.S.* (Powdered myrrh, ℥iij. [℥iv. U. S.]; macerated in rectified spirit, Oij., and strained.) *Dose*, fʒß—ij.

Besides the above, myrrh enters into the composition of the following Off. Preps.

Decocti Aloës Comp.	*Mistura Ferri Comp.*
Pilulæ Aloës cum Myrrhâ.	*Pilulæ Ferri Comp.*
Pilulæ Rhei Comp.	*Pilulæ Galbani Comp.*

Amyris Elemifera.

Octandria, Monogynia.

This is the source which the London College assumes for the Elemi, following Linnæus in this respect. The actual source of the drug, however, is very doubtful.

Elemi (*Resina. L.*)

Description.—Several resins have, at various times, been passed under the name of Elemi, which differ from one another in many respects. The several varieties have a more or less yellow *tint* and some translucency, with a strong terebinthinate *odour*, mixed with that of fennel, and a corresponding bitter, aromatic *taste*.

Commerce.—Dr. Pereira considers that all the elemi at present in English commerce comes from Holland. Brazil, the Levant, and Calcutta, have at different times been its source.

Chem. Comp.—Similar to the turpentines, containing volatile oil, resins, etc.

Oper. and Uses.—Similar to the turpentines. It is only employed in the preparation of the unguentum elemi, and might be advantageously omitted from the list of the Materia Medica.

Off. Prep.—*Unguentum Elemi. L.* (Elemi, ℔j., and suet, ℔ij., are melted together; and being mixed with common turpentine, ℥x., and olive oil, f℥ij., the whole is pressed through linen.) A stimulant ointment.

LEGUMINOSÆ.

Div. I.—Papilionaceæ.

Myrospermum Peruiferum.—The Quinquino.

Decandria, Monogynia.

[A large tree, growing in low sheltered situations, flowering from August to September. It has a thick, resinous bark. The

leaves are pinnate, alternate, the leaflets in two to five pairs, ovate, lanceolate, alternate. The flowers are white, in axillary racemes. The fruit is a coriaceous straw-coloured legume, about four inches long, containing one or two reniform seeds, covered with a balsamic juice.]

Hab.—Peru, Colombia, and Mexico.

Balsamum Peruvianum (*Balsamum liquidum*).

Myroxylon. U. S.

Description.—*Form*, a liquid of the consistence of treacle. *Colour*, opaque and dark reddish-brown. *Odour*, agreeable and balsamic. *Taste*, bitter, aromatic, and acrid.

Prep.—This, which is the commonest variety of Peruvian balsam, is said to be obtained by boiling the bark and young branches of the tree in water. Other kinds are stated to be procured from incisions into the bark.

Commercial Source.—Valparaiso, Lima, and other places on the Peruvian coast.

Chem. Comp.—It contains a *resin*, consisting of two or more acids, dissolved in an *oily matter*, and also a little free *cinnamic acid.*—The oily matter, or *oil of balsam of Peru*, has been called *cinnameine*, having the probable formula $C^{144}H^{65}O^{20}$. It is supposed to consist of cinnamic acid, united to a substance which takes the place of the glycerine found in common fats, and is called Peruvine ($C^{18}H^{12}O^{2}$). The resins contained in the balsam are formed by some alteration in the elements of the cinnameine, which takes place on keeping.—For *cinnamic acid*, see Cinnamon.

Oper. and Uses.—Similar to the balsams generally, being stimulant and expectorant, and diminishing excessive secretion from the mucous membranes. Its principal employment is as an addition to expectorant mixtures, when the bronchial secretion is excessively abundant.

Dose.—f℥ß—j., suspended in water by means of mucilage or yolk of egg.

Balsamum Tolutanum (*Balsamum concretum*). *L.*

Tolutanum. U. S.

The general opinion is, that this balsam is yielded by the same tree as the preceding, although referred by some writers to a separate species, the *Myrospermum toluiferum.*

Description.—*Form*, soft and tenacious when newly imported, but becoming hard and resinous when kept. *Colour*, pale yellowish-red. *Odour*, fragrant and balsamic. *Taste*, sweet, agreeable, and aromatic.

Prep.—It is obtained by making incisions into the bark, the liquid balsam concreting in the vessels into which it is received.

Commercial Source.—It arrives here by way of New York or Jamaica, sometimes from Carthagena.

Chem. Comp.—It contains the same ingredients as balsam of Peru, the proportion of resin merely being greater.

Oper. and Uses.—As the balsam of Peru.

Dose.—Grs. x.—ʒß.

Off. Preps.—*Tinctura Balsami Tolutani. L. Tinctura Tolutani. U. S.*—(Balsam of Tolu, ℥ij., [℥iij., U. S.], dissolved in rectified spirit, Oij., and strained.) *Dose*, fʒß—ij. It may be mixed with water by means of mucilage.

Syrupus Tolutanus. L. S. Tolutani. U. S.—(A strained decoction of the balsam, made into a syrup with sugar. [Tincture of Tolu, f℥j., Syrup, Oj. U. S.]) *Dose*, fʒj.—f℥ß.

Cytisus Scoparius.—The Broom.

Diadelphia, Decandria.

A shrub, having long straight branches, angular and very flexible, with small trifoliate leaves upon them. Its flowers are large, yellow, and axillary, with a two-lipped calyx, the upper lip being entire, the lower three-toothed.

Hab.—Very common in England.

Scoparius. U.S. (*Cacumina recentia.*) *L.*

Description.—The green tops are the officinal part of the plant. They emit a peculiar *odour* when bruised, and possess a bitter disagreeable *taste*.

Chem. Comp.—When burned, broom-tops leave about ·6 per cent. of ash, the most important part of which is the *carbonate of potash*. The fresh plant gives indication of *tannin* and a *volatile oil.*

Oper. and Uses.—A diuretic, whose powers have been the subject of considerable difference of opinion. We have had reason to be satisfied with its activity, so far as we have employed it; looking upon it as a valuable remedy of the class to which it belongs, in the treatment of *dropsical affections.* Large quantities prove purgative and emetic.

Off. Preps.—*Infusum Scoparii. L.* (An ounce of scoparium, macerated in a pint of distilled water, and strained.) *Dose*, f℥ij.—iij., frequently.

Decoctum Scoparii Compositum. L. (Scoparium, juniper fruit, and taraxacum, each, ℥ß, boiled down in distilled water, Oiss., and strained.) *Dose*, f℥j.—ij.

Glycyrrhiza Glabra.—The Liquorice.

Diadelphia, Decandria.

An erect herbaceous plant, with a striated stem and alternate leaves without stipulæ. The leaves are unequally pinnated, and the leaflets slightly stalked, ovate, and blunt. The flowers are arranged in axillary racemes, and are of a purplish colour: the legume is ovate and compressed.

Hab.—South of Europe.

Glycyrrhiza. U.S. (*Radix recens.*) *L.*

Description.—Liquorice root is in the *form* of long cylindrical pieces, of a dirty brown *colour* on the surface, but yellow on the section. Its *taste* is sweet, and its *odour* faint and earthy.

Source.—The best is grown in this country (England), that imported from the continent being of an inferior quality.

Chem. Comp.—It contains *starch*, an *un*fermentable sugar, called *glycyrrhizine*, a neutral crystallizable principle, called *asparagine* or altheine, an acrid *resinous matter*, with woody fibre, etc.

Oper. and Uses.—Demulcent, when employed in the form of decoction or extract, and commonly employed in ordinary catarrh. The extract is used sometimes as a medium for administering other remedies in the form of pills.

Off. Prep.—*Extractum Glycyrrhizæ.* (Prepared as extract of gentian.) It is imported under the name of Spanish or Solazzi juice.

[*Trochisci Glycyrrhizæ et Opii. U.S.* Opium, powdered, ℥ß; extract liquorice, sugar, and gum-arabic, each, ℥x.; oil of anise, f℥ij. Mix, and with water form a mass; divide into lozenges of grs. vj. each. *Dose*, one or two.]

Astragalus Verus.—The Milk Vetch.

Diadelphia, Decandria.

A small shrub, having its branches covered with imbricated scales, and bearing spines, the remains of former petioles. Each leaf has eight or nine pairs of linear hispid leaflets; and the flowers are yellow and papilionaceous, clustered two to five together in the axils of the leaves.

Hab.—Persia, Armenia, and Asia Minor.

Tragacantha. U.S. (*Succus concretus.*) *L.*

Description.—*Form*, usually in flat thin pieces or flakes, with elevations arranged concentrically. *Colour*, white or pale grayish-yellow, and translucent. *Consistence*, tough, and difficult to pulverize, unless in a heated mortar. *Taste*, insipid.

How obtained.—Tragacanth is a spontaneous exudation, occurring when the plant is in an unhealthy condition, and only during the night.

Commercial Source.—The Levant.

Chem. Comp.—A compound of *two* kinds of *gum:* one almost

identical in its properties with common gum-arabic, and hence called *arabine;* the other, termed *bassorine*, from being similar to that from gum-bassora, is not dissolved by water, but swells up into a mucilaginous mass.

Oper. and Uses.—Tragacanth is demulcent, and merely used as a vehicle for other medicines.

Dose.—ʒß—ij.

Off. Prep.—*Pulvis Tragacanthæ Compositus. L. E.* (Powdered tragacanth, gum-arabic, starch, ℥iß., and sugar, ℥iij., rubbed together into a powder.) Merely a vehicle, like simple tragacanth. *Dose*, ʒß—j.

[*Mucilago Tragacanthæ. U.S.* Tragacanth, ℥j.; boiling water, Oj. Macerate for 24 hours, stirring often, triturate well and strain. Merely a vehicle for other medicines.]

Mucuna Pruriens.—The Cow-hage.

Diadelphia, Decandria.

[A twining plant, with pinnately trifoliate leaves. The flowers are large, of a purplish colour, in pendulous racemes, about six to eight inches in length, and having a disagreeable odour. Legumes hispid with innumerable brittle hairs.]

Hab.—The West Indies.

Mucuna. U.S. (*Leguminum pubes.*) *L.*

Description of the Pods.—*Form*, that of an italic *f. Size*, about four inches in length. *Colour*, brownish: the exterior is thickly set with strong brown bristly hairs, serrated towards the point. It is the latter which are officinal.

Oper. and Uses.—Applied to the skin, the hairs give rise to a great deal of irritation and intolerable itching, sometimes accompanied by heat or redness. They are administered internally, as a remedy for intestinal worms, especially the *ascaris lumbricoides.* Their action is supposed to be mechanical, piercing and tormenting them.

Administration.—The hairs are scraped off the pods into syrup or treacle, so as to make it of the consistence of honey. The

dose of this electuary for an adult would be a table-spoonful, and for a child a tea-spoonful, twice a day. An active cathartic should be given subsequently, in order to bring away the worms.

Pterocarpus Santalinus.—The Sandal-Wood Tree.

Diadelphia, Decandria.

[A lofty tree, with alternate branches. The leaves are ternate, rarely pinnate; leaflets ovate, entire, smooth above, hoary beneath. The flowers are in simple, axillary, erect spikes, of a yellow colour, and succeeded by curved, compressed, smooth legumes, each containing one orbicular compressed seed.]

Hab.—Coromandel and Ceylon.

Pterocarpus (*Lignum.*) *L.*

Santalum. U. S.

Description.—It is imported in the *form* of heavy billets, which are of a dark brown *colour* externally, but blood-red internally. It has very little *taste* or *odour*. It yields up a red colouring matter to alcohol, but not to water, unless on addition of an alkali.

Use.—It is merely employed as a colouring ingredient, entering into the composition of the *tinctura lavandulæ composita.*

Pterocarpus Erinaceus.—The Hedgehog Pterocarpus.

Diadelphia, Decandria.

[A middle-sized tree, with spreading branches. The leaves are pinnate, deciduous; the leaflets are alternate, ovate, entire, smooth above, pubescent beneath. The flowers are numerous, yellow, in compound, terminal racemes. The fruit is a compressed orbicular pod, with a membranaceous edge, and covered with bristles, containing one reniform seed.]

Hab.—St. Mary's, on the Gambia.

Kino. U. S. (*Extractum.*) *L.*

Description. — *Form*, small angular masses. *Colour*, dark brownish-black, glistening and opaque; thin layers, however, are transparent, and ruby-red by transmitted light. *Consistence*, very brittle and friable. *Taste*, very astringent and slightly bitter, adhering to the teeth when chewed, and tinging the saliva blood-red.

Varieties.—The above description refers to the African kino, the most common variety of the drug found in English commerce, and yielded by the tree to which the London Coll. refers it: but other kinds of kino are admitted, the produce of other plants, as follows:—1. The *Dhak-tree kino*, obtained from the *Butea frondosa*, considered, by Dr. Christison, equal in every respect to the African, which it closely resembles in appearance. 2. The *Botany Bay kino*, obtained from the *Eucalyptus resinifera*, a tall tree, growing in Van Diemen's Land. It occurs in larger pieces than the two former, and is more bitter, but less astringent. 3. The *East Indian kino*, obtained from the *Nauclea Gambir*. It occurs in small pieces, like a broken-down extract, which are at first bitter, but leave a sweet taste upon the palate.

Extraction.—African kino, as well as the next two varieties, are exudations from incisions made into the stem and branches of the trees; the East Indian is an extract. The London Coll., then, is in error in stating commercial kino to be an extract.

Chem. Comp.—Kino contains *tannin*, a principle called *catechin*, and found also in catechu, *gum*, *extractive*, etc.—*Catechin*, see *catechu*.

Oper. and Uses.—It is a powerful astringent, chiefly employed in *diarrhœa*. We may here remark with respect to astringents in this affection, that their use is, perhaps, less frequently required than is sometimes supposed. Some forms of diarrhœa arise from previous intestinal accumulation, or from irritating ingesta; and when this is the case, their use may not be called for at all, or only after these matters have been expelled from the canal. In the more inflammatory varieties, again, where the stools are slimy and accompanied with straining, leeches to the anus most quickly relieve the patient. It is where a flux appears to be kept

up by an atonic condition of the intestinal vessels, that astringents are most useful in its removal. Kino has been recommended also in *pyrosis*. In *relaxation of the uvula* it is an excellent remedy, either used as a gargle or allowed to dissolve slowly in the mouth.

Dose.—Grs. x.—℈ß.

Off. Preps.—*Tinctura Kino. L. E.* (Powdered kino, ℥iijss.; macerated in rectified spirit, Oij., and strained.) The alcohol dissolves a considerable portion of the drug; but when the Botany Bay kino has been used, it deposits a quantity of jelly on keeping. *Dose*, f ʒj.—ij.

Pulvis Kino Compositus. L. (Kino, ʒxv., cinnamon, ℥ss., and opium ʒj., rubbed to a fine powder and mixed.) *Dose*, grs. x.—xx.

Div. II.—Mimoseæ.

Acacia.—Species of Acacia, yielding Gum.

Polygamia, Monœcia.

Hab.—Senegal, Egypt, Arabia, and India.

Acacia. U. S. (*Gummi.*) L.

Description.—There are several kinds of gum produced from the genus *acacia;* and it is probable that the same species yield different varieties. The officinal gum is the gum-arabic or Turkey gum. *Form*, in tears about the size of a hazel-nut, or broken portions of them. *Colour*, white or yellowish, fissured a great deal all over the surface, transparent in small fragments. *Consistence*, hard and brittle. *Fracture*, vitreous. *Odour*, none or acid. *Taste*, insipid and viscid in the mouth.

Other Varieties.—There are other gums produced by species of acacia. 1. *Gum-senegal.* This is in much larger tears than the preceding, often containing a cavity in their interior; it is less brittle and of a darker colour. 2. *Barbary gum.* This contains many impurities, and is less transparent than the other varieties, with a faint tint of green. It is not entirely soluble in water. 3. *East Indian gum.* Some of this gum is very similar

to gum-arabic, while other specimens are stated to be red or brown.

How obtained.—Gum is a spontaneous exudation from the trunk and branches of the trees which yield it, and which, at the time of its production, appear in the most unhealthy condition.

Commercial Source.—Gum is imported from the Levant, Barbary, and Senegal, as well as from the East Indies and the Cape.

Chem. Comp. and Rel.—At a heat of 100° Fahr. it loses 17 per cent. of *water*, which, however, is not in chem. combination with it. It yields on combustion 3 per cent. of ash. The *gum*, termed *arabine*, is insoluble in alcohol, but soluble in hot and cold water, forming a mucilage, in which di-acetate of lead forms a white precipitate.—Its formula is $C^{12}H^{11}O^{11}$.—The chief constituents of the *ash* are the carbonates of potash and lime. Nitric acid converts arabine into mucic acid.

Oper. and Uses.—Gum is demulcent, and either used in the form of mucilage, or allowed to dissolve in the mouth, for the purpose of sheathing the fauces and allaying the tickling cough of catarrh and bronchitis. It is used also like other demulcents in irritations of other mucous membranes, as of the alimentary and urinary canals. It is employed in the same manner as tragacanth, to suspend insoluble matters in mixtures. From some observations lately made in University College Hospital, by Professor Graham, it would appear that gum may be employed as an article of diet, for *diabetic* patients, without risk of increasing the quantity of saccharine matter discharged in their urine. This is not what would *a priori* have been expected, but it is, nevertheless, a valuable fact to be made aware of.

Off. Prep.—*Mistura Acaciæ. L.* (Acacia, ℥x., dissolved in boiling water, Oj.)

Dose.—f ℥j.—ij.

Acacia Catechu.—The Catechu Acacia.

Polygamia, Monœcia.

[A small tree, covered with a thick brown bark, very red within, and highly astringent. The branches are irregular, downy when young, very spinose when old. The leaves are alter-

nate, with numerous pinnæ, each with many linear leaflets. The common petiole is often prickly. The flowers are pale yellow, in slender cylindrical spikes. The fruit is a straight, smooth, pointed legume, containing six to eight roundish seeds.]

Hab.—The East Indies.

Catechu. U.S. (*Ligni extractum.*) L.

Description.—There are two chief varieties of catechu, the *pale*, in square cakes, and the *brown*, in more or less rounded balls. *Var.* 1. Pale Catechu. *Form*, in square cakes. *Colour*, pale reddish-brown, but grayish-yellow internally. *Consistence*, light and friable. *Fracture*, dull and earthy. *Taste*, astringent and bitter, leaving a sweet taste upon the palate. *Var.* 2. Brown Catechu. *Form*, in irregular balls. *Colour*, a dark chocolate. *Consistence*, less friable than the pale variety. *Fracture*, resinous. *Taste*, less bitter, and leaving more sweetness upon the palate.

How obtained.—The inner wood of the tree is cut into chips, which, being put into earthen pots, are covered with water and boiled. When a considerable portion has boiled away, the liquor is strained, evaporated to a proper consistence in another pot, and poured into square moulds of clay.

Chem. Comp.—It contains a large quantity of *tannic acid*, *catechin*, *mucilage*, and impurities. *Catechin*, called also catechuic acid, is a white uncrystallizable substance, soluble in alcohol and ether, but very slightly so in water. Its formula is $C^{15}H^{6}O^{6}$. When exposed to the air in contact with an alkali, it is readily decomposed, and we have japonic and rubinic acids formed.

Chem. Rel.—*Alcohol* is a better solvent for catechu than water, and the alcoholic solution is precipitated by the latter. Its solutions *redden litmus*. They are *precipitated* by substances which throw down tannin, and also by *sulphuric* and *hydrochloric acids*, *alum*, and *acetate of lead*.

Oper. and Uses.—A valuable astringent, used for the same purposes as kino. "In *dyspepsia*, attended with relaxed bowels," Dr. A. T. Thomson "knows no better remedy."

Dose.—Grs. x.—ʒj.

Off. Preps.—*Infusum Catechu Compositum.* L. U.S. (Pow-

dered catechu, ʒvj., [℥ss., U.S.,] and bruised cinnamon, ʒj., macerated in boiling distilled water, Oj., and strained. *Dose,* f℥j—ij.

Tinctura Catechu. L.E. U.S. (Catechu, ℥iijss., [℥iij., U.S.,] and bruised cinnamon, ℥ijss., [℥ij., U.S.,] macerated in proof spirit, Oij., and strained.) *Dose,* fʒj—ij.

Div. III.—Cœsalpineæ.

Hœmatoxylon Campechianum.—The Common Log-wood.

Decandria, Monogynia.

[A middle-sized tree, with spreading branches, which are spinous below the leaves. The leaves are pinnate; the leaflets are obovate or obcordate. The flowers are in terminal spikes or racemes, of a yellowish colour. The fruit is a compressed, lanceolate legume, containing two seeds.]

Hab.—Campeachy, as well as in Jamaica and other West India islands.

Hœmatoxylum. U.S. (*Lignum.*) L.

Description.—The heart-wood is the officinal part. It is imported in billets, which are cut into chips for use. It is of a dark cherry-red *colour,* with a feeble *odour*, and sweetish astringent *taste.*

Commercial Source.—Campeachy, Honduras, and Jamaica.

Chem. Comp.—Besides the constituents of all woods, logwood contains a *volatile oil,* a *resinous* substance, a principle called *hæmatine* or *hæmatoxyline*, to which its colour is due, *tannin*, a nitrogenized substance analogous to gluten, free *acetic acid*, and various salts.—*Hæmatoxyline* is a crystallizable principle occurring in reddish-yellow scales, little soluble in water, but soluble in alcohol and ether. It contains nitrogen. It is much used as a dye; but is deprived of colour by de-oxidizing agents.

Chem. Rel.—Decoction of logwood is deepened in colour by *alkalies*, while the *mineral acids* slightly precipitate it, as do substances which throw down tannin.

Oper. and Uses.—It possesses astringent properties, which

render it serviceable in *intestinal fluxes.* Its red colouring matter being absorbed, appears in the *urine*, rendering it of a purplish-red. It is given in the form of extract or decoction.

Off. Prep.—*Extractum Hæmatoxyli.* (Prep. as ext. gentianæ.) *Dose*, grs. x—ʒß.

[*Decoctum Hæmatoxyli.* U. S.—Logwood in chips, ℥j.; water, Oij.; boil to vj. and strain. *Dose*, f℥j.—ij.]

Tamarindus Indica.—The Tamarind Tree.

Monadelphia Triandria.

[A middle-sized tree, with spreading branches, and alternate, pinnate leaves, having from twelve to fifteen pairs of small, oblong, obtuse, entire leaflets. The flowers are in short racemes, deciduous, yellow, varied with red. The fruit is a legume, which is curved, compressed, three to twelve-seeded. Seeds compressed, obliquely truncated.]

Hab.—East and West Indies, Arabia, and Egypt.

Tamarindus. U.S.—(*Leguminis pulpa.*) *L.*

Description of the Pod.—It is very similar in appearance to the garden bean, and consists of a brittle husk, containing from 1 to 4, or more hard seeds, and an intermediate pulpy sarco-carp, traversed by ligneous fibrils. It is this pulp which is officinal, having a sweet and acidulous taste.

Preservation.—The East Indian tamarinds are sent to this country merely dried, and the legumes are longer than those from the West Indies. The latter are imported preserved in syrup, the epicarp having been previously removed.

Chem. Comp.—The pulp of the tamarind contains *sugar* and *gum*, with *pectic*, *malic*, *citric*, and *tartaric acids*, *bi-tartrate of potash*, *vegetable fibre*, and *water*.

Oper. and Uses.—Tamarinds are moderately laxative, and are often combined with senna, as in the confectio sennæ, or with a neutral salt. When infused in water, they form an agreeable refrigerant drink for fever patients.

Cassia.—Species of Cassia yielding Senna.

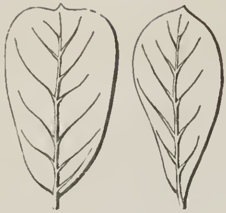
Decandria, Monogynia.

Species yielding Senna.—Much difference of opinion has prevailed with respect to those species of the genus Cassia which afford the several varieties of commercial senna. With the exception of including the C. *obtusata* in the species C. *obovata,* the following enumeration is that of Dr. Christison, which we are disposed to regard as the most correct.

1. Cassia lanceolata. *Hab.*—Northern Africa, especially Upper Egypt and Nubia.—*Leaflet,* oblong and acute or obtuse.

2. Cassia acutifolia. *Hab.*—Arabia Felix.—*Leaflet,* larger, narrower, and more pointed than the last, as well as thinner and more flexible.

3. Cassia elongata. *Hab.*—The borders of the Red Sea; naturalized in India.—*Leaflet,* long and comparatively narrower than the two preceding. Its length varies, but it is altogether the longest leaf found in commercial senna.



4. Cassia obovata. *Hab.*—Egypt, Nubia, and Northern Africa; naturalized in India, Italy, and Provence.—*Leaflet*, obovate and mucronate.

[5. Cassia Marilandica. *Hab.*—The middle and southern parts of the United States.—*Leaflet*, lanceolate, oblong, mucronate.]

The leaves of the three first species are very closely allied, some persons considering the *C. elongata* to be merely a variety of *C. acutifolia*.

The London Coll. recognises only the *C. lanceolata* and the *C. obovata*.

Senna. U.S.—(*Folia.*) *L.*

Description.—*Form*, the leaflets of senna vary in shape with the species yielding them, but all agree in being unequal at the base. *Colour*, more or less of a grayish or yellowish-green. *Odour*, peculiar and not disagreeable. *Taste*, nauseous and mucilaginous.

Varieties.—There are three principal varieties of senna in English commerce, the *Alexandrian*, *Tripoli*, and *East Indian*, of which the last is by far the purest and most valuable.

1. Alexandrian Senna.—Imported from Alexandria. It is collected in Nubia and Upper Egypt, and conveyed to the grand depôt at Boulac, where it undergoes adulteration, under the superintendence of the Egyptian government. It consists principally of the leaflets of *C. lanceolata*, with a few of the *C. obovata*. The *C. acutifolia* leaflets are rarely discoverable in it now.—This kind always presents a more or less broken appearance, and contains stalks, pods, and flowers.

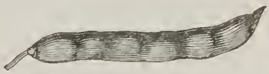
2. Tripoli Senna.—Imported from Tripoli. It consists, chiefly

like the last, of *C. lanceolata*, but few of the *obovata* being discoverable.—It resembles the Alexandrian also very much in its general appearance, but the leaflets are smaller, more broken, and contain more stalks.

3. East Indian Senna.—The finest kind is known as Tinnivelly senna, and is carefully cultivated for the British market. It is imported from Madras. It consists entirely of the leaflets of C. *elongata*, which are quite entire and often very long. An inferior kind of senna is obtained from India, consisting also of the leaflets of the *C. elongata*, but they are narrower than those of Tinnivelly, of a yellowish colour, and many of them much discoloured; there is also a great intermixture of stalks, flowers, and pods.

Adulterations.—The East Indian senna is never adulterated; and of the other two kinds, the adulteration practised upon the Alexandrian is far the most extensive. Both this and the Tripoli contain various kinds of *impurities*, as stalks, pods, stones, and dirt; but other leaves and fruits, not of the genus Cassia at all, are purposely mixed with the Alexandrian. Those found in the senna sent to England belong to the *Cynanchum argel*, a plant of the Nat. Ord. Apocynaceæ, and to the *Tephrosia apollinea*, another leguminous species. They may be described as follows:

1. *Cynanchum argel.*—Leaves about an inch long, equal at the base, having no lateral nerves on the under disk, of a pale colour, thicker, tougher, and more coriaceous than those of the cassia; intensely bitter and griping violently.



2. *Tephrosia apollinea.*—Obovate-oblong and marginate leaves, with parallel transverse veins, and silky on the under side. The pods are long, narrow, and 6 to 7-seeded.

The leaves of the *Colutea arborescens* and *Coriaria myrtifolia*, though common on the Continent, are not to be found in the Alexandrian senna of the English trade. When all impurities are removed, it passes under the denomination of *picked senna.*

Chem. Comp.—Besides the ordinary constituents of leaves,

senna contains a small quantity of *volatile oil*, a yellow *colouring principle* containing nitrogen, *cathartine*, *albumen*, and some *salts.*—*Cathartine* is a neutral body containing no nitrogen, uncrystallizable, of a bitter taste, and yellowish-red colour. It is soluble in water and alcohol, but insoluble in ether. Subacetate of lead precipitates it of a clear yellow. It produces, in a high degree, all the effects of senna.

Chem. Rel.—Water, at 96°, takes up all the active part of senna. When boiled, its volatile oil is dissipated, and the solution acquires a tendency to gripe.

Operation.—Senna is cathartic, sometimes giving rise to sickness, and griping a little during its operation. It appears to act, both by augmenting the peristaltic movements, and favouring the flow of the intestinal secretions. It is said to determine like aloes, but less powerfully, to the pelvic organs.

Uses.—In consequence of its tendency to gripe, senna is rarely administered alone. Combined with neutral salts, such as sulphate of magnesia or tartrate of soda, it forms a useful purgative in most cases of constipated bowels, and is the aperient most frequently employed in the treatment of febrile and inflammatory diseases. It should not be used, however, in inflammatory states of the alimentary canal, where its irritant operation would prove injurious. Dr. Todd recommends senna as the best purgative, in the *atonic* form of *duodenal dyspepsia.* (*Cyclop. of Pract. Med.* art. *Indigestion.*)

Off. Preps.—*Infusum Sennæ Compositum. L. Infusum Sennæ. E. U. S.* (Senna, ℥jss., and sliced ginger, ʒj., macerated in boiling distilled water, and strained.) [Senna, ℥ij.; coriander bruised, ʒij.; boiling water, Oj. U. S.] When the infusion is kept for any length of time, the cathartine undergoes decomposition; and the infusion no longer purges, but merely gripes. It should not be made with *boiling* water, as the London Pharmacopœia directs, but with cold or merely warm water, as it is then less liable to gripe. Dr. Paris states, that the nauseous taste of it may be covered by an infusion of bohea tea: but it is not disagreeable to many persons, and is certainly less unpalatable when taken on first waking in the morning. Dr. A. T. Thomson considers the purgative property to be increased by combination

with mistura camphoræ, or decoction of guaiacum. Magnesia, rhubarb, or carbonated alkalies, as destroying its active powers, should not be prescribed with it. *Dose*, f℥ss.—iij.

Tinctura Sennæ Composita. L. (Senna, ℥iij.; bruised caraway, ʒij., and cardamom seeds, ʒj.; with raisins, ℥iv.; macerated in proof spirit, Oij.; and strained.) *Dose*, fʒij.—f℥ß, added to purgative mixtures.

[*Tinctura Sennæ et Jalapæ. U. S.* (Senna, ℥iij.; jalap, in powder, ℥j.; coriander and caraway, bruised, each, ℥ß; cardamoms, bruised, ʒij.; sugar, ℥iv.; diluted alcohol, Oiij. Macerate and filter.) *Dose*, f℥ß—f℥j.]

Confectio Sennæ, L. U. S. Water, Oiv., in which figs, ℔j., and liquorice, ℥iij., have been boiled down, is made into a syrup with sugar, ℔ijß, and then mixed with cassia pulp, tamarind pulp, and prunes, each, ℔ß; after which, coriander, ℥iv., and senna, ℥viij., finely powdered, are added, and the whole is mixed together.) Various adulterations are said to be practised upon this preparation, in which jalap often takes a share. It is a useful laxative, frequently employed in cases of piles and habitual constipation. *Dose*, ʒj.—iv.

Syrupus Sennæ. L. U. S. (Senna, ℥ijß [℥ij. U. S.], and fennel, ʒx. [℥j. U. S.], are macerated in boiling water, Oj.; and the infusion, being strained, is mixed with manna, ℥iij., and sugar, ℥xv., and boiled to a proper thickness.) A laxative for children, to whom it may be given in *doses* of ʒj.—iij.

Cassia Fistula.—The Purging Cassia.

Decandria, Monogynia.

[A middle-sized tree, with alternate, pinnate leaves. Flowers on long racemes, of a bright yellow colour, and fragrant. The legume is cylindrical, long, of a blackish-brown colour, divided internally into numerous cells, by thin, transverse partitions, each containing one seed, surrounded by a soft, blackish pulp.]

Hab.—East and West Indies, China, and South America.

Cassia. U. S. (*Leguminum pulpa. L.*)

Description of the Fruit.—A long, black, cylindrical pod,

about an inch in diameter, and from one to two feet in length, slightly curved, and having two longitudinal furrows at the sutures of the valves. Internally, it is divided into a great many compartments, by thin, transverse septa, each containing a single seed enveloped in a blackish, soft pulp. The best pods are the heaviest, and they should not rattle when shaken.

Preparation of the Pulp.—The pulp is the officinal part; and to obtain it, the pods are to be bruised, the pulp dissolved out with boiling water; and the solution, after straining, to be evaporated to a due consistence. It has an agreeable, sweetish taste.

Oper. and Uses.—It is a mild purgative or laxative, according to the dose, often griping, however, and giving rise to flatulence during its operation. It is seldom, if ever given, unless in combination with other remedies of the same class. It enters into the composition of the confectio sennæ, and of another confection which bears its name.

Dose.—ʒj.—℥ij., according to the effect desired.

Off. Preps.—*Confectio Cassiæ. L.* (Cassia pulp, ℔ß, tamarind pulp, ℥j., and manna, ℥ij., are mixed with syrup of rose, f℥viij., and evaporated to the proper consistence.) *Dose*, ʒij.—℥j.

Copaifera.—Various species yielding Copaiba.

Decandria, Monogynia.

Species yielding Copaiba.—It appears, as the result of researches made upon this point, that the whole of the genus Copaifera, is capable of affording the balsam of copaiba, although some species are of finer quality than others. Those from which the copaiba found in the British trade is obtained, are the following:

C. Jacquini, formerly called *officinalis*, inhabits Venezuela and the West Indian islands, and is the only tree which affords the West Indian copaiba.

<table>
<tr><td>C. multijuga and</td><td rowspan="5">All yield the fine Brazilian copaiba.</td></tr>
<tr><td>C. Martii, both found in Para,</td></tr>
<tr><td>C. guianensis, in Guiana,</td></tr>
<tr><td>C. Langsdorfii and</td></tr>
<tr><td>C. coriacea, both in Santa Paulo,</td></tr>
</table>

The London College thus very much limits the source, by confining it to the *C. Langsdorfii.*

COPAIBA. U. S. (*Resina liquida. L.*)

DESCRIPTION.—A transparent liquid, about the consistence of olive oil. *Colour*, a pale wine colour. *Odour*, peculiar. *Taste*, aromatic and somewhat acrid. This refers to the Brazilian copaiba, which is the most esteemed. The West Indian is of a darker colour, and less transparent, thicker, and of a more nauseous flavour.

HOW OBTAINED.—Deep incisions are made into the stem during the wet season or shortly afterwards, when the balsam exudes in very great abundance. Sometimes this operation is repeated twice in a year.

COMMERCIAL SOURCE.—Principally Para and Maranham. Sometimes it comes from Rio Janeiro, and occasionally from the West Indies.

CHEM. COMP.—It consists, when fresh, of about 40 per cent. of *volatile oil*, and 50 per cent. of a yellow brittle resin, with 1 per cent. of a brown oily resin; but these proportions vary by keeping, the oil becoming less, and the resins, especially the latter, increasing in quantity.—The *volatile oil* is lighter than water, and has the peculiar odour of the balsam. It is isomeric with oil of lemons, its formula being $C^{10}H^{8}$.—The *yellow resin* has the common acid properties of resins, and a similar composition ($C^{40}H^{32}O^{4}$). The *brown resin* appears to be formed by some alteration of the volatile oil.

ADULTERATIONS.—Copaiba is said to be adulterated with *oil of turpentine* and *fixed oils*, especially castor oil. The former is recognised by its odour being evolved on heating a small portion; and the fixed oils by heating a little of the balsam on paper, when a resinous spot will be occasioned, surrounded, if thus sophisticated, with an oily stain.

OPERATION.—It acts in a manner very similar to the turpentines. Taken into the stomach, it proves stimulant both locally and generally, and sometimes even gives rise to nausea or vomiting: it imparts its odour to the breath and urine. It also acts specifically upon the mucous membranes, but concentrates its effects in the greatest degree upon the genito-urinary system.

Uses.—Its principal use is in the treatment of *gonorrhœa,* for which it may be administered in any stage of the disease, with the precaution of reducing excessive inflammatory action by the previous employment of depletion and general antiphlogistic measures. It is serviceable also, like the balsam and turpentines, in diminishing excessive secretions from the bronchial tubes.

Administration.—It may be taken either floated upon water, or suspended by the aid of mucilage or yolk of eggs. A common plan is to rub it with calcined magnesia, so as to make it of a proper consistence for *pills.* The nauseous odour and taste of the drug have led of late years to its being enclosed in gelatine capsules.

Dose.—♏xx.—f ʒj.

ROSACEÆ.

Division I.—Roseæ.

Rosa Canina.—The Common Dog Rose.

Icosandria, Polygynia.

A well-known shrub, with a prickly stem, and rose-red flowers of an agreeable odour, which are succeeded by a scarlet fruit, known as the *hip.*

Hab.—Many parts of Europe.

Rosa Canina. (*Fructûs pulpa.*) L.

Description.—The fruit consists of the thick, fleshy, persistent calyx, which, when cut open, is seen to contain hairy achenia. The pulp of the calyx, which is the officinal part, has a sweet and acidulous taste.

Oper. and Uses.—It is only employed in the preparation of the confection.

Off. Prep.—*Confectio Rosæ Caninæ. L.* (The pulp, ℔j., is gently heated, and rubbed with sugar, ʒxx., into a conserve.) It has a great tendency to candy by keeping, but is a useful pill-basis, as also an agreeable vehicle for many active remedies.

Rosa Gallica.—The French or Red Rose.

Icosandria, Polygynia.

This rose has a scentless flower, of a purplish-red colour: several varieties are known to cultivators.

Hab.—Austria. Commonly cultivated for medicinal purposes.

Rosa Gallica. U. S. (*Petala.*) *L.*

Description.—Both the fresh and the dried petals are officinal. The dried petals of the shops are the unblown flower-buds, the calyx and claws having been cut off. When full-blown, much of the astringency, for which they are valued, is lost. The appearance of the dried buds is velvety, their *colour* a purplish-red, their *odour* pleasant, with a bitter and astringent *taste.*

Chem. Comp.—Rose-leaves contain a *volatile oil, tannic* and *gallic acids,* some *salts,* etc.

Oper. and Uses.—Slightly astringent: only used in the form of its officinal preparations.

Off. Preps.—*Infusum Rosæ Compositum. L. U. S.* (The dried petals, ℨiij.; [℥ss. U. S.,] macerated in boiling distilled water, Oj., [Oijss. U. S.,] with addition of some dilute sulphuric acid, f℥jss., [fℨiij., U. S.] and strained, a little sugar, ℨvj., [ℨjss., U. S.] being subsequently added.) It is of a fine red colour when newly made, but spoils very quickly when kept. Its principal use is as a vehicle for other remedies, such as sulphate of magnesia or the mineral acids, as well as being a common and elegant mode of administering the disulphate of quina. It is used as a gargle, also, in affections of the throat, either by itself, or with alum or capsicum in addition. *Dose,* f℥j.—ij.

Confectio Rosæ Gallicæ. L. U. S. (Rose petals, ℔j., beaten in a stone mortar with sugar, ℔iij., into a confection.) Used as a pill-basis, and for the formation of linctuses, etc. *Dose,* ʒj.—ij. [The U. S. directs powdered roses, ℥iv.; sugar, ℥xxx.; clarified honey, ℥vj.; rose water, f℥viij.]

Mel. Rosæ. L. (A strained infusion of rose petals, [roses ℥iv.; boiling water, Oijß,] mixed with honey, ℔v., and boiled down to

a proper consistence.) Used as a mild astringent application in the aphthæ of children; and sometimes administered to them internally, as a vehicle for more active medicines. *Dose*, ʒj.

Rosa Centifolia.—The Cabbage Rose.

Icosandria, Polygynia.

Hab.—Asia. Commonly cultivated.

Rosa Centifolia. U. S. (*Petala.*) *L.*

Description.—As with the preceding, both the fresh and dried petals are officinal. They should be selected from full-blown flowers, before they begin to fall. They lose their odour by drying. Their taste is sweetish, and slightly astringent.

Chem. Comp.—Similar to rosa gallica.

Oper. and Uses.—It is used only in the form of its officinal preparations, and for the sake of its perfume.

Off. Preps.—*Aqua Rosæ. L. E. U. S.* (Rose petals distilled with water and a little proof spirit.) Used for the formation of lotions, in place of distilled water, its agreeable odour giving it the preference.

Syrupus Rosæ. L. (A strained infusion of dried rose petals, rose leaves, ℥vij.; boiling water, Oiij., made into a syrup with sugar.) It is a gentle laxative for children. *Dose*, ʒij.—℥j.

[*Unguentum Aqua Rosæ. U. S.* Rose water, oil of almonds, each, f℥ij.; spermaceti, ℥ss.; white wax, ʒj., melt and add rose water, constantly stirring.]

Division II.—Potentilleæ.

Potentilla Tormentilla.—The Common Tormentil.

Icosandria, Polygynia.

This is a slender-stemmed herbaceous plant, growing commonly on dry and barren pastures and heaths. Its stem leaves are sessile and 5-lobed, the leaflets being obovate and deeply ser-

rated. The flowers are of a bright yellow colour, and placed singly at the extremity of long peduncles arising from the axils of the leaves. The petals are four in number, and the calyx 4-cleft with four external bracteolæ.

Hab.—Many parts of Europe.

Tormentilla. U.S. (*Radix.*) *L.*

Description.—*Form* of the root-stock, oblong, thick, and tuberculated, and provided with numerous radicles. *Colour*, a dark reddish-brown. *Taste*, strongly astringent.

Chem. Comp.—It contains about 17 per cent. of *tannic acid.* There have also been found in it a trace of *volatile oil*, some *gummy matters*, etc.

Oper. and Uses.—It is a powerful astringent; and although seldom prescribed, is well adapted for use in *diarrhœa*, under the same restrictions as other remedies of the class. The decoction may be used also as an injection in atonic leucorrhœa.

Dose.—ʒß—j.

Off. Prep.—*Decoctum Tormentillæ. L.* (Bruised tormentilla, ℥ij.; boiled in distilled water, Ojss., and strained.) *Dose*, f℥j.—℥ij.

[Rubus Villosus.—Blackberry.

Icosandria, Polygynia.

A well-known shrubby plant, from three to six feet high, with a stem furrowed and beset with prickles. The leaves are ternate and quinate, pubescent, with the petioles and midrib prickly. The flowers are white, in racemes, followed by large black fruit.

Hab.—Most parts of the United States, in thickets, old fields, and edges of woods.

Rubus Villosus. U.S. (*Radix.*)

Description.—*Form*; branching, round, of various sizes. *Colour*, grayish-brown externally, white internally. *Odour*, very feeble, earthy. *Taste*, bitterish, astringent.

Chem. Comp.—No exact analysis has been made of this root, but experiments have shown that its principal active ingredient is *tannin*, which is confined to the cortical portion, and hence, an equal bulk or weight of the smaller is more efficient than of the larger roots. The berries contain malic acid, tannin in small quantity, and pectin.

Oper. and Uses.—The blackberry root is a mild tonic and astringent, and has been much employed, especially in domestic practice, in the bowel complaints of children, with considerable success. It is usually given in decoction made with ℥j., of the root to Oj., of water. Dose, f℥j.—ij.

The root of another native species, the *R. trivialis* or dewberry, is used for the same purposes, and is preferred by many as being more astringent.

Division III.—Spireæ.

Gillenia Trifoliata.—Indian Physic.

Icosandria, Pentagynia.

An indigenous herbaceous plant, with an erect stem, furnished ternate leaves, the upper ones lanceolate, serrate, the lower obtuse, with an abrupt termination. The flowers are white, or pinkish-white, in loose terminal corymbs. The fruit is a capsule, which is five-celled and many-seeded. It has a perennial root, consisting of numerous long fibres. It flowers in May and June.

Hab.—In the United States, from Florida to Canada, between the sea and the mountains.

Gillenia. U.S.—(*Radix.*)

Description.—*Form*, numerous matted roots, about as thick as a quill, several inches long, wrinkled, somewhat annulated or undulated. *Colour*, reddish-brown externally, whitish within. *Odour*, feeble. *Taste*, unpleasant, bitter.

Chem. Comp.—Several examinations of this root have been made, and it has been found to contain a *peculiar principle*, insoluble in ether and water, but dissolved by alcohol and dilute

acids; *a red colouring matter, a volatile colouring matter, starch, gum, resin, wax,* and *fatty matter.*

Oper. and Uses.—Gillenia is a mild emetic, acting very much like ipecacuanha, for which it is the best indigenous substitute, in cases requiring emesis. Like the foreign root also, it acts as a tonic to the stomach and bowels, and in combination with opium, determines to the skin. It has received the most unqualified praise from nearly every practitioner that has employed it, and may be considered a valuable addition to the Materia Medica. This applies equally to another species, the *G. stipulacea,* which replaces it to the west of the mountains. *Dose,* as an emetic, grs. xxx.—ʒj.; as a tonic, grs. ij.—iv.]

Division IV.—Amygdaleæ.

Amygdalus Communis.—The Almond Tree.

Icosandria, Monogynia.

There are two varieties of this species, one of which yields sweet and the other bitter almonds. They differ in one or two very minor particulars.

Hab.—Barbary, Syria, and many parts of Asia and Northern Africa. Cultivated in the South of Europe.

Amygdala Amara. U.S. (*Var. a. Nuclei.*) *L.*

Description.—Both this and the sweet almond, removed from the shell, are oval in shape, rounded at one end and pointed at the other, and covered with a reddish-brown epidermis. The bitter almond is smaller than the sweet, it has a bitter taste, and gives out a peculiar odour when rubbed with water.

Commercial Source.—Mogadore. They are always shelled before importation.

Chem. Comp.—The bitter almond has the same composition as the sweet almond noticed below, with the addition, however, of a crystallizable neutral substance called *amygdaline,* to the decomposition of which, by the action of emulsine, is due the production

of hydrocyanic acid; and volatile oil of bitter almonds, when the seeds are treated with water.

Amygdaline is a principle contained in many plants of the order Rosaceæ, such as the cherry-laurel, the pips of apples, the kernels of the peach, etc. It is *obtained* by digesting the marc from which the fixed oil has been expressed in boiling alcohol, from which it crystallizes in pearly scales. From water it crystallizes in the form of prisms (a hydrate).—Amygdaline is not volatile, but is *decomposed at a high temperature*, yielding ammonia. When decomposed by *nitric acid* or other oxidizing agents, we have, among the products, oil of bitter almonds, benzoic, cyanic, formic, and carbonic acids. Treated with *potash*, it is resolved into an acid called amygdalic acid ($C^{40} H^{26} O^{24}$), while ammonia is given off. *Formula*, $C^{40} H^{27} N O^{22}$. Neither *oil of bitter almonds* nor *prussic acid* are contained in the almond or or its marc, but are *produced* when *water* is added to these substances, from the decomposition of the amygdaline by the action of the *albumen* or *emulsine* upon it; a decomposition analogous to ordinary *fermentation*. A solution of amygdaline in water possesses no odour, and is not liable to change by keeping; but if a small portion of the *albumen*, either from the bitter or sweet almond be added, decomposition of the amygdaline immediately commences, and the odour of the volatile oil and prussic acid is given off. Liebig and Wöhler have given the *following formula* as the expression of the decomposition:—

1 atom of *amygdaline* is resolved into

1	atom of	hydrocyanic or prussic acid .	C^2	H	N	
2	——	oil of bitter almonds	C^{28}	H^{12}		O^4
2	——	formic acid	C^4	H^2		O^6
½	——	sugar	C^6	H^5		O^5
7	——	water		H^7		O^7
1	——	of *amygdaline*	C^{40}	H^{27}	N	O^{22}

A boiling temperature destroys the catalytic power of the albumen.

Volatile oil of bitter almonds is a transparent colourless liquid,

having the odour of the peach blossom, sp. gr. 1·043. By keeping, it deposits crystals of *benzoine*, a body isomeric with it. *Formula*, $C^{14}\ H^5\ O^2 + H$.—By the action of air and oxidizing agents, it is converted into benzoic acid ($C^{14}\ H^5\ O^3$). When perfectly pure, this oil is probably not poisonous, as Dr. Pereira's experiments appear to indicate, and as would be expected on the view of its composition. The common oil sold in the shops is obtained by distillation of the marc with water, and therefore contains a large amount of prussic acid.

Oper and Uses.—Eaten in too large quantities, they exercise a powerful influence over the nervous system, giving rise to nausea, vomiting, coma, and convulsions, symptoms which may issue in a fatal termination. Some individuals, indeed, experience unpleasant effects from the very smallest portion, a febrile kind of urticaria being sometimes occasioned. An emulsion of bitter almonds may be used as a sedative in such cases as hydrocyanic acid is fitted for, and, externally, is employed with temporary benefit, in some skin affections, accompanied by severe itching, such as *prurigo*.

Amygdala Dulcis. U. S. (*Var. β. Nuclei.*) *L.*

Description.—The Jordan almonds are the most esteemed; they are longer than the bitter, without odour, and have an agreeable sweet mucilaginous taste.

Commercial Source.—The Jordan almonds come from Malaga, another kind from Valentia.

Chem. Comp.—Almonds yield about 50 per cent. of a *fixed oil*, and the remainder consists of *soluble albumen* or *emulsine*, together with *sugar*, *gum*, and *woody fibre*. The *albumen* or *emulsine* is similar to that obtained from other vegetables or animal fluids, but possesses a peculiar catalytic power, which it loses after coagulation by heat or acids.

Oper. and Uses.—Almonds are demulcent, when administered in the form of any of their officinal preparations.

Off. Preps.—*Confectio Amygdalæ.* L. (Blanched almonds, ℥viij., are beaten with gum arabic, ℨj., and sugar, ℥iv., into a confection.) It is recommended to keep them powdered sepa-

rately, and not to mix them till required for use. It is employed for making the mist. amygdalæ.

Mistura Amygdalæ. L. U.S. (Almond confection, ℥ijss., rubbed with distilled water, Oj., and strained through linen.) It is used as a demulcent in catarrhal affections, especially of the pulmonary membrane, forming the basis of cough mixtures. Its mucilaginous consistence fits it for allaying the irritation of the upper portions of the respiratory passages, which gives rise to the tickling cough of catarrhal bronchitis. It is also employed as a bland vehicle for exhibiting more active medicines, such as hydrocyanic acid or nitre. For these purposes, some prefer an emulsion made with the bitter almond. *Dose,* f℥j.—ij.

Amygdalæ Oleum (*Oleum ab alterutriusque nucleis expressum*). L.

Oleum Amygdalæ. U. S.

Description.—It is a very liquid oil, of a paler straw-colour than olive oil, and congealing less readily by cold. It has no odour, but a faint oleaginous taste.

Extraction.—Although the Pharmacopœia states that both varieties are employed for the expression of the oil, the greater expense of the sweet almond has thrown it entirely out of use for this purpose. The bitter almonds are macerated for a certain time in water, and the oil expressed without heat.

Chem. Comp.—It is a *fixed oil,* composed of 76 per cent. of *oleine,* and 24 per cent. of *margarine.*

Oper. and Uses.—It is demulcent, and may be administered as such, either suspended by the aid of yolk of egg or mucilage in water, or made into a linctus with confection of dog-rose.

Prunus Domestica.—The Plum Tree.

Icosandria, Monogynia.

Hab.—Syria, chiefly near Damascus, cultivated in Europe.

Pruna. U. S. (*Drupæ exsiccatæ.*) L.

Description.—There are two principal kinds of prunes im-

ported, one large, pale and sweet, in use for the table, and the other smaller, dark, and less sweet, but somewhat austere, used for medicinal purposes. The plums are dried in the sun in countries where it is sufficiently hot, and by artificial heat where it is colder.

Oper. and Uses.—They are mildly laxative, and commonly employed, with infusion or decoction of senna leaves, as a domestic aperient. They enter into the composition of *confection of senna.*

[Cerasus Virginianus.—Wild Cherry.

Icosandria, Monogynia.

A middle-sized tree, with spreading branches; the bark of the stem dark gray, of the branches reddish. *Leaves*, oval, oblong, glabrous or bearded on midrib. *Flowers* in elongated, spreading racemes, white. *Fruit*, globose, purplish-black, of a sweetish bitter taste. Wood hard, close-grained, coloured. There has been a difference of opinion respecting the species to which the specific name of *Virginianus* belongs, and it has been shown by the best botanical authority in this country, Drs. Torrey and Gray, that it has been erroneously applied to the tree under consideration, which is, in fact, the *C. serotina;* but, as the error has been so long sanctioned in Materia Medica, it has been deemed best to continue it under its former designation.

Hab.—The United States.

Prunus Virginiana. U. S. (*Cortex.*)

Description.—*Form*, pieces of various sizes, brittle, not fibrous, with the epidermis removed. *Colour*, reddish-brown, where freshly fractured, somewhat grayish. *Odour*, when fresh, like bitter almonds or prussic acid, fainter when dry. *Taste*, aromatic, bitter.

Chem. Comp.—From an analysis made by Mr. S. Procter, this bark is found to contain *starch*, *resin*, *gallic acid*, *tannin*, *fatty matter*, red colouring matter, some salts, and the usual vegetable

constituents. When the bark is distilled with water, a *volatile oil* is obtained, with some hydrocyanic acid. This volatile oil, as is shown by Mr. W. Procter, is analogous to that of bitter almonds, and does not pre-exist in the bark, but is composed of *hydruret of benzule* and *hydrocyanic acid*, derived from the decomposition of *amygdaline*, as in the other case.

Oper. and Uses.—Wild cherry bark is a tonic of a peculiar character, for while it acts in invigorating the digestive organs, it at the same time allays irritation both in the sanguineous and nervous apparatus, and hence may be given in states of the system which preclude the use of other tonic remedies. It has been found very useful in diseases of the pulmonary organs, in some complaints of the stomach and bowels, and also in hectic fever, as well as those of an intermittent type. When given in substance, the dose is ʒss. to ʒij. It should never be administered in decoction, as most of its virtues are dissipated by heat. A very excellent preparation for many purposes is the syrup, which is largely employed; the dose is ʒss.

Off. Prep.—*Infusum Pruni Virginanæ. U. S.* Wild cherry bark bruised, ℥ss.; water, Oj.; macerate and strain. *Dose*, ℥ij.—iij.]

Division V.—Pomeæ.

Cydonia Vulgaris.—The Quince.

Icosandria, Pentagynia.

Hab.—Candia, cultivated in the south of Europe and in England.

Cydonia (*Semina.*) *L.*

Description.—The seeds are the officinal part; they are of an ovate *form* and pointed, flat upon one side, and convex upon the other. Their *colour* is reddish brown. The testa has a mucilaginous taste, and yields up much mucilage to water.

Oper. and Uses.—The mucilage of quince seed, which is its officinal preparation, is demulcent, and only used as an external application.

Off. Prep.—*Decoctum Cydoniæ. L.* (The quince seeds ℨij., boiled in water, Oj., and the mucilage strained.)

MYRTACEÆ.

Punica Granatum.—The Pomegranate.

Icosandria, Monogynia.

This is a small tree, with a brownish bark and has lanceolate leaves on short footstalks. The flowers are terminal on the young branches, large, and of a rich scarlet colour; the fruit is about the size of an orange, with a coriaceous rind, and crowned with the teeth of the calyx. When a longitudinal section of the fruit is made, the singular appearance is presented of its being unequally divided into two chambers by a horizontal diaphragm, the upper one containing from 3 to 9 cells, and the lower 3 cells, with membranous partitions. A pulp is enclosed, containing innumerable seeds.

Hab.—The shores of the Mediterranean, cultivated in the middle parts of Europe.

Granatum. U. S. (*Fructûs cortex.*) L.

Description.—The dried rind is in irregular-*shaped* fragments, about the thickness of a line, which are of a brown *colour* externally, but paler within. Its *consistence* is brittle, and its *taste* very astringent.

Chem. Comp.—It contains *tannin* and a little *fatty matter*, with *sugar*, *lignin*, etc.

Oper. and Uses.—Pomegranate rind has been in use from the earliest periods as an astringent, and is useful in most cases where such remedies are indicated.

Dose.—ℨss.—j.

Decoctum Granati. L. (Two ounces of pomegranate rind boiled, with a pint and a half of distilled water, down to a pint, and strained.) *Dose*, f℥j.—ij.

Flores Granati. D.

The flowers are retained as officinal by the Dublin College, and possess considerable astringency; they are known as *balaustine* flowers.

Radix Granati. E. D.

The bark of the root is rendered officinal by both the Edinburgh and Dublin Colleges. It occurs in quills or fragments of them, is of a grayish-yellow *colour*, *brittle*, and has an astringent *taste.*

Oper. and Uses.—A decoction, administered in full doses, gives rise to nausea, and, acting on the nervous system, occasions vertigo, tremblings and a sensation of intoxication. It has long been used in Hindostan as a remedy for *tape worm*, and its efficacy appears to be very decided. Of a decoction, made by boiling ℥ij. of the bark in Oij. of water down to Oj., the dose is f℥ss. every half hour till the worm is expelled, which mostly happens in about twelve hours after commencing the remedy. Aperients should be taken before and after its use.

Melaleuca Minor.—The Lesser Melaleuca.

Polyadelphia, Icosandria.

This is a crooked tree, with elliptical, lanceolate 3 or 5-nerved leaves, which are silky while young, and give out an aromatic odour when bruised. The flowers are arranged in terminal spikes, and the corolla is white.

Hab.—The Molucca Isles.

Cajuputi. (*Oleum è foliis destillatum.*) L.

Oleum Cajuputi. U. S.

Description.—A very *liquid* transparent oil, having a greenish *colour*, and an *odour* described as similar to that produced by the

mixture of several aromatics, such as cardamom, camphor, rosemary, etc., with a corresponding pungent, aromatic *taste*. It is readily soluble in alcohol.

Extraction.—The leaves, which smell strongly of the oil, are bruised and distilled with a sufficient quantity of water. The green oil collects on the surface of the condensed liquid, and is removed.

Adulterations.—A factitious oil has been prepared by distilling oil of rosemary with cardamoms and camphor. At present, however, the oil is pure.

Operation.—When taken internally, it acts as a powerful diffusible stimulant, producing a sensation of warmth at the epigastrium and occasionally nausea or vomiting. If its use be too long continued, the tongue is apt to become dry, and red or brown.

Uses.—1. Its principal value, as an internal remedy, is for the relief of *flatulent distension of the stomach*, indicated by pain under the left breast, accompanied or not by palpitations, a condition very common in nervous and anæmic females. In such cases we have very rarely known cajuput oil to fail of giving relief to the pain and causing eructation of the flatus. Intestinal distension, however, appears to be less under its influence. 2. It has been recommended in hysteria, chorea, epilepsy, and other *spasmodic diseases;* but we should anticipate less favourable results from the employment of this, than from remedies of a different kind, such as tonics, cathartics, narcotics, etc. 3. *Asiatic Cholera* is a disease in the treatment of which it has acquired a considerable reputation both in India and Europe; and also in *low fevers*, it has been advantageously prescribed, with a view of obtaining its stimulant and antispasmodic operation.—As an *external remedy*, it is a valuable rubefacient in painful affections of a rheumatic or neuralgic character.

Dose.—♏ v.—x. To be of any use at all, the dose should rarely be less than this.

Caryophyllus Aromaticus.—The Clove Tree.

Icosandria, Monogynia.

[A middle-sized tree, with coriaceous, dotted, obovate, lanceo-

late leaves, with strong nervures. The flowers are yellowish-red, on a purplish-red calyx, odorous, cymose. The fruit is a purplish, elliptical, one-seeded berry.]

Hab.—The Moluccas. Cultivated now in Sumatra, Mauritius, and various parts of the East and West Indies.

Caryophyllus. U. S. (*Flores nondum explicati, exsiccati.*) *L.*

Description.—The clove consists of the tapering nail-shaped calyx, surmounted by four teeth, having between them, at the top, a round ball, which is the unexpanded corolla. Its *colour* is a dark brown, its *odour* fragrant, and its *taste* aromatic, acrid, and hot. The finest cloves are plump, and give out their oil when squeezed by the nail; they come from the Moluccas.

Chem. Comp.—Cloves contain a *volatile oil, tannin, caryophylline, eugenine, gum,* and *vegetable fibre.*—*Caryophilline* is a substance extracted from cloves by alcohol, and having a composition similar to camphor.—*Eugenine* is a crystalline body, deposited from the water in which cloves have been distilled.

Oper. and Uses.—Cloves are aromatic and stimulant. The infusion of them is useful in some forms of *dyspepsia;* and, according to Dewees, sometimes proves effectual in the obstinate *vomiting of early pregnancy,* when other treatment has failed to relieve it.

Off. Prep.—*Infusum Caryophilli. L.* (Bruised cloves, ʒiij., [ʒij., U.S.], macerated in boiling distilled water, Oj., and strained.) *Dose,* f℥j.—ʒij.

Oleum Caryophylli. U.S. (*Oleum è floribus destillatum.*) *L.*

Description.—This volatile oil is *heavier than water,* sp. gr. 1·061; and, when freshly prepared, is deficient in *colour,* but acquires a brownish-red by being kept. It possesses a strong and peculiar *odour,* and an aromatic, acrid, and burning *taste.*

Preparation.—It is obtained by frequent distillation of the cloves with water.

Chem. Comp.—It consists of *two different oils,* one being *lighter* than water and the other *heavier,* having the sp. gr. 1·079.—The

light oil has the formula $C^{10}H^{8}$, being isomeric with oil of turpentine.—The *heavy oil* has acid properties, and consequently has been named caryophyllic acid. It may be separated from the other by means of potash, with which it forms a salt, from which it is liberated by sulphuric acid. Its formula is $C^{24}H^{15}O^{5}$.—Oil of cloves is very violently acted upon by nitric acid.

Oper. and Uses.—It is a useful carminative, and commonly prescribed as an addition to purgative pills, with a view to the prevention of griping, as well as to impart an agreeable odour to them. When put into the hollow of a carious tooth, it will sometimes relieve the pain which proceeds from it.

Dose.—Gtt. ij.—vi.

Eugenia Pimenta.—The Allspice Tree.

Icosandria, Monogynia.

[A medium-sized tree, with terete branches, the younger ones pubescent. The leaves are oval or oblong, smooth, dotted. The flowers are numerous, on axillary and terminal peduncles, of a greenish-white colour. The fruit is a succulent, dark-coloured, two-seeded berry.]

Hab.—Jamaica, and other West Indian islands.

Pimenta. U. S. (*Baccæ immaturæ exsiccatæ*). *L.*

Description.—The allspice is globular in *form*, and rough upon the *surface*, being in *size* somewhat larger than a peppercorn. The *colour* is brownish-black; *odour*, aromatic; and *taste*, warm and aromatic. It consists of a shell, in which the greater part of the odour and taste resides, and two enclosed seeds.

Chem. Comp.—Allspice contains a *volatile oil*, an acrid *resinous* substance, *gum*, etc.; probably, also, a small proportion of tannic and gallic acids.—The *volatile oil* has the peculiar odour of pimenta, but in all other respects is very analogous to oil of cloves, consisting of a *light* and *heavy oil*, the latter being acid.

Oper. and Uses.—Pimenta is stimulant, aromatic, and carminative, having uses similar to those of cloves.

Off. Preps.—*Oleum Pimentæ. L. E. U. S.* (Allspice, bruised, is distilled with water.) *Dose* and *uses*, as Ol. Caryoph.

Spiritus Pimentæ. L. (Prepared as spirit of nutmeg, or by dissolving the oil in proof spirit.) *Dose*, fʒj.—iv.

Aqua Pimentæ. L. (Bruised allspice, ℔j., or oil of pimenta, ʒij., distilled with water, *cong.* ij., and a little proof spirit, f℥vij.) *Use*, like the other aromatic waters, as a vehicle for more active medicines. *Dose*, f℥j.—ij.

UMBELLIFERÆ.

Carum Carui.—The Caraway.

Pentandria, Digynia.

A biennial herb, having long bi-pinnated leaves, of a deep green colour and sweet taste. Its flowers are white, and grow on terminal umbels, usually consisting of ten radii.

Hab.—Most parts of Europe.

Carui (*Fructus*). L.

Carum. U. S.

Description.—The half-fruits, or mericarps, are what pass under the name of Caraway Seeds. They are rather *elongated* and slightly curved, with five primary filiform ridges. They have a brownish *colour*, a single *vitta* in each channel, an aromatic peculiar *odour*, and an aromatic warm *taste*.

Chem. Comp.—The aromatic property of caraway seeds is dependent on the *volatile oil* which they contain.

Oper. and Uses.—Caraway seed is stimulant and aromatic, and its preparations are commonly employed for the relief of flatulence, in the same manner as the volatile oils, especially in the treatment of children's diseases.

Off. Preps.—*Oleum Carui, L. E. U. S.* (Procured by distillation of the fruit with water.) Chiefly employed as a carminative adjunct to pills; enabling them, if purgative, to act upon the bowels without griping. *Dose*, gtt. j.—x.

Spiritus Carui. L. (Procured by distilling the bruised fruit, ℥xxij., with spirit, *cong.* j., and the addition of a small quantity of water, Oij.) It is extemporaneously prepared by dissolving the oil in spirit. It is an aromatic and carminative adjunct to draughts and mixtures. *Dose,* f ʒj.—iv.

Aqua Carui. L. (Procured by the distillation of caraway seeds, ℔iss., with water, *cong.* ij., and a little spirit, f ℥vij.) It is extemporaneously prepared by rubbing the oil with sugar, or carbonate of magnesia, adding water, and straining. It is a carminative vehicle for purgative medicines, and chiefly used for children. *Dose,* f ℥ij.—iv.

Pimpinella Anisum.—The Anise.

Pentandria, Digynia.

This plant has an upright branched stem, about a foot high: its radical leaves are cordate, lobed, and incised; the middle ones pinnate and lobed, while the upper are trifid and linear. It has white flowers in terminal flat umbels, without involucra.

Hab.—Egypt and the Levant. Cultivated in various parts of Europe.

Anisum. U. S. (*Fructus.*) *L.*

Description.—The mericarps are of an ovate *form*, with five primary filiform ridges, and covered with downy hairs. They are of a grayish-green *colour*, each channel has three *vittæ;* the *odour* is aromatic, and the *taste* aromatic and sweet.

Commer. Source.—Alicant and Germany.

Chem. Comp.—The activity of anise rests in the *volatile oil* the seeds contain.

Oper. and Uses.—As the Caraway.

Off. Preps.—*Oleum Anisi. L. E. U. S.* (Prepared as oleum carui.) Use, as oleum carui.

Spiritus Anisi. L. (Prepared as spiritus carui.) Use, as spiritus carui.

Fœniculum Vulgare.—The Common Fennel.

Pentandria, Monogynia.

A biennial plant, with a round striated and glaucous stem, which has the appearance of being jointed. The leaves are pinnatisect, decompound with linear segments, and the flowers of a golden-yellow colour, arranged in terminal umbels without involucra.

Hab.—Many parts of Europe.

Fœniculum. U. S. (*Fructus. L.*)

Description.—The *fruit* is of an oval form, brown *colour*, and aromatic *odour* and *taste*. Its activity depends upon *volatile oil.*

Oper. and Uses.—As caraway; but rarely employed.

Aqua Fœniculi. L. (Prepared as aqua anethi.)

Opoponax Chironium.—The Opoponax.

Pentandria, Monogynia.

[A perennial plant, six or seven feet high, resembling the parsnip, with a thick root, and rough stem. The leaves are bipinnatisect, with unequally cordate, crenate, obtuse leaves. The flowers are yellow, the umbels compounded of many rays. Fruit smooth, flattened at the back with a dilated, convex margin.]

Hab.—A native of the south of Europe.

Opoponax (*Gummi-resina. L.*)

Description.—It occurs in the *form* of reddish-yellow tears, or irregular pieces, of an unpleasant *odour*, and bitter, acrid taste.

Extraction.—It is obtained from incisions made into the root and stem: the white juice which exudes dries and hardens into the gum-resin of the shops.

Chem. Comp.—See Assafœtida.

Oper. and Uses.—Similar to ammoniacum and other fœtid gum-resins. Seldom prescribed.

FERULA ASSAFŒTIDA.—The Assafœtida Plant.

Pentandria, Digynia.

[A perennial, tall plant, with a terete, simple stem. The root is very large, and abounds in a thick, milky, fœtid juice. Leaves radical, pinnatisect, lobes oblong, obtuse. The flowers are yellow. The fruit is flat, thin, and reddish-brown, like that of the parsnip.]

Hab.—Persia.

ASSAFŒTIDA. U. S. (*Gummi resina.*) *L.*

DESCRIPTION.—Like gum-resins generally, assafœtida is met with in the *form* both of tears and irregular masses, the former being rare, but of the finest quality. The masses have themselves an amygdaloid aspect, both externally and on the broken surface; such as is sufficient to indicate them composed by an agglutination of tears, with a softer connecting matter. *Colour*, whitish within, acquiring a rose-red colour on exposure of the surface, passing into a yellowish-brown. *Consistence*, brittle. *Fracture*, conchoidal, and occasionally exhibiting cellular interspaces between the tears. *Odour*, penetrating and alliaceous. *Taste*, acrid, bitter, and peculiar.

EXTRACTION.—Transverse sections are made of the roots, after clearing away the earth which surrounds them. A milky juice exudes, which in two or three days is scraped off and hardened by exposure to the sun. Fresh slices are made for another supply, and the process repeated till the roots are exhausted.

COMMER. SOURCE.—It comes to us from the Persian Gulf by way of Bombay.

CHEM. COMP.—*Assafœtida, sagapenum, ammoniacum, galbanum,* and *opoponax*, have a very similar composition, consisting of *volatile oil, resin, gum,* various salts, etc. The proportions of the ingredients and some of their properties vary in the different exudations. The volatile oil averages from 3 to 5 per cent., and the resin from 45 to 70 per cent.

The *volatile oils* resemble each other very nearly in their physical properties, all of them being lighter than water. Their

ultimate composition has not been determined, but probably some or all of them contain *sulphur*. The odour varies according to the plant from which it is obtained. The resins all consist of two substances, both soluble in alcohol, but only one soluble in ether.

Chem. Rel.—Assafœtida softens at a moderate temperature, so as to allow of being squeezed through a cloth and the impurities separated. *Water* forms an emulsion with it, which lets fall the resin by degrees, and when added to the alcoholic solution renders it milky. *Potash* dissolves the whole of the drug.

Operation.—Assafœtida is stimulant and antispasmodic, and was regarded also by Cullen as an expectorant. It gives rise to a sensation of warmth when taken into the stomach, and provokes the expulsion of flatus from the organ. Its peculiar alliaceous odour becomes evident in all the secretions.

Uses.—In *flatulent* and *spasmodic* conditions of the *alimentary tube* it has frequently proved highly useful, as also in *spasmodic asthma* and other diseases of a convulsive nature. It is of great value in *hysteria*, whether taken by the mouth or exhibited in the form of enemata. The very nauseous odour and taste of the drug, moreover, well adapt it for the detection of impostors and malingerers.

Dose.—Grs. v.—xx.

Off. Preps.—*Mistura Assafœtidæ. L. U. S.* (Assafœtida, ℨv., [ℨij., U. S.,] rubbed gradually with water, Oj., [Oss. U. S.,] until they are intimately mixed.) *Dose*, f℥ss.—j.

Tinctura Assafœtidæ. L. U. S. (Assafœtida, ℥v., [ℨiv. U. S.,] macerated in rectified spirit, Oij., and strained.) *Dose*, fℨss.—j.

[*Pilulæ Assafœtidæ. U. S.* Assafœtida, ℥jss.; soap, ℨss., mix and divide into 240 pills.

Emplastrum Assafœtidæ. U. S. Assafœtida and lead plaster, each, ℔j., galbanum and yellow wax, each, ℔ss., melt and strain.]

Ferulæ species incerta.—An uncertain species yielding Sagapenum.

Pentandria, Digynia.

There is no proof that the drug sagapenum is derived from a plant of the genus *Ferula* at all, as stated by the London Coll.

Sagapenum (*Gummi resina.*) *L.*

Description.—It is met with both in the *form* of tears and masses, the best being evidently composed of agglutinated tears. Its *colour*, brownish-yellow and semitransparent. *Consistence*, tenacious, softening with the heat of the hand. *Odour*, alliaceous, and *taste* alliaceous and acrid.

Commer. Source.—The Levant.

Chem. Comp.—See Assafœtida.

Oper. and Uses.—Similar to assafœtida and other gum-resins.

Dose.—Grs. v.—ʒß.

Off. Prep.—*Pilulæ Sagapeni Comp. L.* (Sagapenum, ℥j., and aloes, ʒss., beaten up with syrup of ginger.) A warm purgative. *Dose*, grs. v.—℈j.

Dorema Ammoniacum.—The Ammoniacum Plant.

Pentandria, Digynia.

[A tall perennial plant, of a glaucous green hue; somewhat like the parsnip. The stem is thick. The leaves are large, petiolate, bi-pinnate; the petioles amplexicaul at base. The flowers are white, in proliferous umbels. The fruit is slightly compressed at the back, edged with three distinct ridges.]

Hab.—Persia, a few miles south of Ispahan.

Ammoniacum. U. S. (*Gummi resina.*) *L.*

Description.—It occurs in the form of tears, or masses composed of agglutinated tears, with an intermediate softer and browner material. Externally, the *colour* of the tears is yellowish; internally, white and opaque, becoming yellowish on exposure. *Consistence* of the tears, brittle, and easily pulverized at ordinary temperature; but it softens with the heat of the hand, and in warm weather the powder runs together into a mass. *Odour*, peculiar. *Taste*, mucilaginous, bitter, and acrid.

Extraction.—In the summer, when the plant has arrived at

perfection, the stem and branches are pierced by innumerable beetles which attack it, and the milky juice, which it contains in great abundance at this period, oozes out from the punctures. It dries in the form of tears upon the plant, which are picked off for exportation.

Commer. Source.—Bombay, sometimes the Levant.

Chem. Comp.—See Assafœtida.

Oper. and Uses.—In many respects it resembles assafœtida, but appears to be more specific in its action upon the bronchial membrane, and thus is more highly in repute as an expectorant in chronic bronchitic affections. It is much less used for this purpose now than formerly, being at the present time rarely employed, except as a plaster for discussing a variety of *indolent tumours*.

Dose.—Grs. x.—ʒß.

Off. Preps.—*Mistura Ammoniaci. L. U.S.* (Made as mist. assafœtida.) *Dose*, f℥ss.—j.

Emplastrum Ammoniaci. L. E. U.S. (Ammoniacum, ℥v., is dissolved in distilled vinegar, f℥viij., and evaporated, with constant stirring, to a proper consistence.) A discutient plaster.

Emplastrum Ammoniaci cum Hydrargyro. L. (A few grains of sulphur, grs. viij., are stirred with a small quantity of olive oil, fʒj., until they unite, and with this mercury, ℥iij., is rubbed till the globules are no longer visible. Liquefied ammoniacum, ℔j., is lastly added in small quantities at a time, and the whole mixed.) A discutient plaster like the last, but more powerful, on the ground of the mercury it contains.

Galbanum Officinale.—The Galbanum Plant.

Pentandria, Digynia.

[Plant unknown. Seed compressed at the back, elliptical; ridges seven,. elevated, compressed, bluntly keeled, not winged; the lateral distinct, marginal. Channels broadish, concave, without vittæ. Commissure flat, dilated, bivittate; vittæ broad, somewhat curved. *Don.*]

There is no good evidence of the correctness of this reference

as the source of galbanum, the London College taking it on the authority of Don.

Galbanum. U. S. (*Gummi resina.*) *L.*

Description.—Galbanum is met with both in the *form* of tears, and of masses composed of agglutinated tears. The tears are more or less rounded, of a pale yellowish-brown *colour*, and translucent. *Consistence*, tough, and pulverizable only in cold weather. *Odour*, strong and peculiar. *Taste*, disagreeable, bitter, and acrid. Like other gum-resins, the goodness of the drug is judged of by the number of tears, and freedom from sand, straw, and similar impurities.

Commercial Source.—The Levant and India.

Chem. Comp.—See Assafœtida.

Oper. and Uses.—Similar to assafœtida. Externally, it is used as a stimulant plaster.

Dose.—Grs. x.—ʒß.

Off. Prep.—*Pilulæ Galbani Compositæ. L.* (Galbanum, myrrh, sagapenum, each, ʒjss., and assafœtida, ʒss., beaten up with syrup into a mass.) A pill much used in the flatulence of hysteria, and of atonic dyspepsia. *Dose*, grs. v.—x.

Emplastrum Galbani. L. (Galbanum, ℥viij., and turpentine, ʒx., are melted together, and then powdered resin of spruce-fir, ʒiij., and melted lead plaster, ℔iij., are mixed with them.) A rubefacient and discutient plaster.

Cuminum Cyminum.—The Cumin.

Pentandria, Digynia.

[An annual plant, with a slender branched stem about a foot high, with many cleft leaves, the lobes linear and setaceous. The flowers are white or pink. The fruit is that of the Caraway, but larger, with a strong and aromatic odour.]

Hab.—Egypt and Greece. Cultivated in Sicily and Malta.

Cyminum (*Fructus*). *L.*

Description.—The mericarps are similar in form to the caraway, but larger; each has 5 primary and 4 secondary prickly filiform ridges, with a vitta beneath each of the latter. *Colour*, a grayish-yellow. *Odour*, aromatic. *Taste*, aromatic and peculiar.

Commercial Source.—Sicily and Malta.

Chem. Comp.—Its value is dependent on the *volatile oil* it contains. It is of a pale yellow colour, and lighter than water. It has been found to consist of two bodies, one called *cymene* ($C^{20}H^{14}$); the other called *cumyl* ($C^{20}H^{12}O^{2}$), which, in contact with an alkali, absorbs more oxygen, and becomes converted into *cuminic acid* ($C^{20}H^{11}O^{3}$), a substance sometimes found in the oil when long kept.

Oper. and Uses.—As the caraway, but scarcely ever used.

Anethum Graveolens.—The Dill.

Pentandria, Digynia.

An annual or biennial plant, having a jointed stem, which is finely channelled and glaucous. Its leaves are tri-pinnate, with linear and pointed segments, their stalks being broad and sheathing at the base, where they are attached to the joints of the stem. The umbels have no involucra, and bear flowers of a yellow colour.

Hab.—Middle and south of Europe. Cultivated in England.

Anethum (*Fructus*). *L.*

Description.—Dill-seed is of an oval *form*, flat and dorsally compressed, being surrounded by a light-coloured membranous *ala*. It has 5 primary ridges, and one *vitta* in each channel. *Colour*, brown. *Odour*, aromatic. *Taste*, warm and agreeable.

Chem. Comp.—It owes its activity to the presence of *volatile oil.*

Oper. and Uses.—As the caraway.

Off. Prep.—*Aqua Anethi. L.* (Prepared as aq. carui.) Use as aq. carui.

Daucus Carota.—The Common Carrot.

Pentandria, Digynia.

An indigenous umbelliferous plant, with a yellowish tap-shaped root, and a hispid channelled stem; the leaves are also more or less hairy, bi-pinnatisect, and supported on petioles nerved upon the under side. It has large umbels bearing white flowers. The general involucrum consists of numerous pinnatifid leaflets, while the partial has trifid or entire leaflets. The umbels are concave when in seed. The wild carrot supplies the fruit, and the cultivated variety the root for medicinal use.

Dauci Fructus. L.

Description.—*Form*, oval and dorsally compressed, each mericarp having 5 primary filiform and bristly ridges, and 4 secondary ones, which are more prominent, winged, and split into a row of spines. There is a single vitta beneath each of the latter. *Odour*, powerful and peculiar. *Taste*, strong, aromatic, and bitter.

Chem. Comp.—The fruit owes any activity it possesses to *volatile oil.*

Oper. and Uses.—Stimulant and carminative.

Dauci Radix. L.

Description.—A yellow tap-shaped fleshy root, of an agreeable peculiar *odour*, and sweet aromatic *taste*.

Chem. Comp.—It contains a *volatile oil*, with a large quantity of *pectin* or *pectic acid*, a red crystallizable colouring principle called *carotine*, and some *uncrystallizable sugar*. Its principal constituent is *starch*, to which it owes its value as an esculent.

Pectin is found in the juices of many roots and ripe fruits, to which it imparts the property of forming jellies when boiled with sugar. It is soluble in water, but precipitated with alcohol. —*Formula*, $HO + C^{12}H^{17}O^{11}$.—Pectin is neutral, but by boiling with an alkali we obtain a bi-basic acid, called *pectic acid*, isomeric with it, and very similar in physical properties. By nitric acid pectin is resolved into saccharic and then into mucic acid.

Oper. and Uses.—Chiefly of use for making carrot-poultices.

Conium Maculatum.—The Spotted Hemlock.

Pentandria, Digynia.

This is an indigenous umbelliferous plant, easily recognised by its round, smooth, spotted stem, and every part emitting a most disagreeable smell when bruised. Its leaves are of a deep shining green colour, and tri-pinnate, with pinnatifid leaflets. Their footstalks are furrowed and sheathing at the base. The general involucrum consists of from three to seven leaflets, and the partial of three leaflets: the fruit is readily known by its undulating crenulated ridges.

Conii Folia. L. U. S.

Description.—The fresh and dried leaves are both officinal. The latter should have a green *colour*, and the characteristic *odour* of the plant.

Drying and Preservation.—Much care must be exercised in preserving the medicinal properties of the dried leaves. They should be collected just previous to the flowering of the plant, and the foliaceous parts, alone, quickly dried at a temperature not exceeding 120°. Well-stoppered and blackened bottles should be used for their preservation, since they lose their green colour (one of the best indications of their activity) on exposure to solar light. The dried leaves should emit a powerful odour of conia, when rubbed with potash.

Chem. Comp.—Hemlock leaves contain a *volatile oil*, an alkaloid called *conia*, a little *resin*, vegetable *albumen*, *salts*, etc.

The *volatile oil* has an acrid taste, and the peculiar odour of the plant, but does not possess its poisonous properties.

Conia (called also *coneine*, *conicine*, or *cicutine*) exists much more abundantly in the fruit than in the leaves. It is a colourless oily *liquid*, sp. gr. 0·89, exists in the plant combined with an acid called *coniic*, and is obtained by distillation with an alkali. It is sparingly soluble in water, but more so in alcohol and ether. —*Formula*, $C^{12} H^{14} NO$.—It is easily decomposed with evolution of ammonia. Some of its *salts*, with acids, are crystallizable; and all of them, by the simple addition of *a caustic alkali*, evolve

the vapour of conia. It forms insoluble compounds with *tannic acid*, and therefore causes a precipitate with solutions containing it.

Operation.—The medicinal action of hemlock is anodyne and antispasmodic: the latter operation depending upon the sedative influence which it probably exerts over the spinal cord. It has been stated, that its continued use is followed by the disappearance of malignant and other tumours. In excessive quantities it is an energetic poison, although apparently varying in the mode of its manifestation: for the most part, however, it brings about its fatal result by difficult respiration and coma.

Uses.—It is employed as an anodyne to relieve the suffering which accompanies some *malignant tumours*, such as *carcinoma;* and some practitioners anticipate, from its continued use, even their entire removal. In such cases, it is either internally administered, or applied externally as a plaster or poultice. Its sedative and antispasmodic powers fit it for use in such *convulsive coughs* as pertussis, as well as for other cases in which peculiarity of temperament imparts a similar character to coughs resulting from bronchitis or phthisical states of the lungs.

Dose.—Grs. iij.—iv. of the powdered leaves, gradually increased till some obvious effects are produced.

Off. Preps.—*Extractum Conii. L. U.S.* (Prepared as extract of aconite.) *Dose*, grs. iij.—v., or more, gradually increased. Frequently not to be depended on, as met with in the shops.

Tinctura Conii. L. E. U.S. (Dried conium leaves, ℥v. [℥iv. U.S.] and bruised cardamoms, ℥j., macerated in proof spirit, Oij., and strained.) *Dose*, fʒß—j.

Pilulæ Conii Compositæ. L. (Extract of conium, ʒv., and powdered ipecacuanha, ʒj., beaten into a mass with mucilage of acacia.) *Dose*, grs. v.—x. A useful sedative and expectorant pill.

Cataplasma Conii. L. (A linseed poultice, with the addition of extract of hemlock, ℥ij.)

Conii Fructus. L. Conii Semen. U.S.

Description.—The fruit is ovate in form, and compressed

laterally, having five undulating, crenulated, primary ridges. They retain their activity much longer than the leaves.

Chem. Comp.—The fruit contains the same active principles as the leaves.

Oper. and Uses.—As the leaves.

Coriandrum Sativum.—The Officinal Coriander.

Pentandria, Digynia.

A plant naturalized in some parts of England, having an erect branched stem, which grows to the height of about two feet. Its leaves are bi-pinnate, the leaflets becoming linear as they ascend on the stem. There is merely a single leaflet in place of the general involucrum, while the partial has mostly three. The flowers are white; and the partial contain many more radii than the general umbels. Every part of the plant, when bruised, gives out a most unpleasant smell.

Hab.—South of Europe.

Coriandrum. U. S. (*Fructus.*) *L.*

Description.—The fruit is globular in *form*, about the *size* of white pepper, and having the mericarps closely adhering. Its *colour* is a yellowish-white; *odour* and *taste*, agreeable and aromatic.

Chem. Comp.—It owes its activity to *volatile oil.*

Oper. and Uses.—Aromatic, and slightly stimulant. Used to correct the griping of purgative medicines.

Dose.—Grs. x.—ʒj.

[ARALIACEÆ.

Aralia Nudicaulis.—False Sarsaparilla.

Pentandria, Pentagynia.

An indigenous, herbaceous perennial, with one leaf and a single flower-stalk arising from the root, or from a very short

stem. The leaf is bi-ternate, with the lateral leaflets sessile and the terminal ones petiolate, all ovate, serrulate, and smooth. The flowers are in an umbel, of a yellowish-white colour, succeeded by small, round, dark-coloured berries.

Hab.—Most parts of the United States, in rich soil and shady situations.

Aralia Nudicaulis. U. S. (*Radix.*)

Description.—Pieces of various sizes, about the thickness of the finger, cylindrical, wrinkled. *Colour,* brownish-yellow. *Odour,* aromatic, balsamic. *Taste,* sweetish, warm, aromatic.

Chem. Comp.—No proper examination of this root has been made; but it is known to contain starch, resin, and a volatile oil.

Oper. and Uses.—It is a stimulating diaphoretic of some power, and has been advantageously used in chronic rheumatism and other complaints. It does not offend the stomach even when given somewhat freely. The usual method of administering it is in decoction.]

CUCURBITACEÆ.

Cucumis Colocynthis.—The Colocynth.

Monœcia, Syngenesia.

This is an annual plant, with a trailing hispid stem like the common cucumber. Its leaves are cordate-ovate and many-lobed, covered with whitish hairs on the under surface. It possesses short tendrils, and the flowers are of a yellow colour, solitary, axillary, and stalked. The fruit is globose.

Hab.—Syria, Northern Africa, the Greek Archipelago, and the Cape.

Colocynthis. U. S. (*Peponum pulpa exsiccata.*) *L.*

Description.—The officinal colocynth is the peeled fruit. It has a light and spongy appearance, and a tough *consistence.*

The *form* of the pepo is globular, its *colour* white, and it is 2 or 3 inches in *diameter*. Its *taste* is extremely bitter.

Commer. Source.—The Levant and Mediterranean coast of Africa.

Chem. Comp.—Colocynth pulp contains a bitter principle called *colocynthin, resin, gum, pectin,* some *salts, woody fibre,* etc. *Colocynthin* very much resembles a resin in its physical properties, differing from it, however, in being soluble in water as well as in alcohol. When heated to destruction it evolves a little ammonia. May not the so-called *colocynthin* be a compound of a resinous acid and an alkaloid?

Operation.—Colocynth is an active cathartic hydragogue in full doses, and operating sometimes with nausea and vomiting. It appears occasionally to augment the secretion of urine.

Uses.—It is a purgative well fitted to unload the bowels at the commencement of *febrile* and *inflammatory diseases*, with the exception of those affecting the intestinal canal itself. By the watery stools which it occasions, the intestinal vessels are depleted, and, accordingly, colocynth is a very useful medicine, when the *liver* or the *portal system* is in a state of *congestion.* In the treatment of *dropsical diseases*, it has been in a great measure replaced by elaterium. In hyperæmic or excited conditions of the *brain*, it is a purgative to which much preference is often justly shown. It proves very efficacious also in cases of *obstructed bowels* and neglected *constipation.*

Dose.—Grs. v.—x., rarely employed, however, except in the form of extract or decoction.

Off. Preps.—*Extractum Colocynthidis.* (Colocynth cut into pieces and boiled with distilled water for a considerable time, the liquor being subsequently strained and evaporated.) *Dose*, grs. v.—℈ß.

Extractum Colocynthidis Compositum. L. U.S. (Colocynth, cut into pieces, ℥vj., is macerated with a gentle heat in proof spirit, *cong.*, j., and, after straining the spirit, it is evaporated with powdered scammony, ℥iv., purified extract of aloes, ℥xij., and soap, ℥iij., to a proper consistence, powdered cardamoms, ℥j., being added towards the close of the operation.) This is a highly valued preparation, but very often adulterated by the use of *adulterated scammony.* The substances introduced in this way

are principally *chalk* and *starch;* the former is detected by the extract effervescing with hydrochloric acid, and the latter by iodine striking a blue colour with the filtered decoction. Dr. Pereira states that some druggists substitute *oil* of cardamoms for the powdered seeds, and by this means increase the odour of the preparation; but, unless some inert powder be added, the strength of the preparation would be somewhat increased also. We have found the aromatic introduced into the compound extract of colocynth, for the most part, quite efficacious in lessening or entirely preventing the griping operation of the simple drug, and have, accordingly, abandoned the practice of giving henbane with it, as recommended by Dr. Paris, having moreover found that the addition of this narcotic *does* sometimes distinctly lessen its purgative action.

Dose, grs. v.—℈j.

Enema Colocynthidis. L. (Compound extract of colocynth, ℈ij., mixed with soft soap, ℥j., and water, Oj.)

Momordica Elaterium.—The Squirting Cucumber.

Monœcia, Syngenesia.

This plant, like the preceding, has a trailing hispid stem, but it is without tendrils. The leaves are cordate and somewhat lobed, and the flowers axillary, of a yellow colour, reticulated with green veins. The pepo is small, elliptical, and hairy, and forcibly expels its contents when ripe by the separation of its stalk.

Hab.—Greece and South of Europe. Cultivated in this country.

Elaterium. U.S. (*Pepones recentes.*) *L.*

The fresh pepos are employed for the purpose of preparing the extract of elaterium of the London College, which generally passes under the name of ealterium.

Preparation of Elaterium.—The unripe pepos, or those near upon bursting, are sliced longitudinally, and their pulp scooped out upon a sieve, and washed by repeated affusion of cold water. Pressure should be avoided whenever a fine preparation is desired.

After the fluid has stood for a few hours, a sediment takes place, which, when dried upon fine linen, constitutes elaterium.

Description.—*Form*, fragments, thin, flat, or slightly curled, and marked by the linen on which it was dried. *Colour*, a pale grayish-green. *Consistence*, friable. *Taste*, acrid and bitterish.

Chem. Comp.—Elaterium is composed of several principles, which a very simple analysis will enable us to detect. If we *digest it in alcohol*, we leave a white residue, consisting of *starch* and *woody fibre*, and obtain a green solution, which yields, on evaporation, a solid substance, called by Dr. Paris *elatin*. *This, treated with ether*, is resolved into two other substances, the ether taking up the *green matter* and leaving a white crystallizable substance called *elaterine*, to which the activity of the drug is due.

Elaterine occurs in the form of white, silky, and prismatic crystals, insoluble in water or ether, but soluble in hot alcohol. It is neutral, and, as it is said to evolve ammonia when heated, probably contains *nitrogen*, which might have been further suspected from its possessing such active properties. Its composition, according to Hennell, is $C^6H^{12}O^5$.—The *green matter* has some of the properties of a resin united with the green colouring matter of plants.

Hennell's analysis gives, in 100 parts of elaterium, 44 elaterine, 17 resin and colouring matter, and 40 starch, woody fibre, etc.

Goodness.—It should be in thin flakes and friable, and the lighter and more spongy it is the better. It should not effervesce on addition of hydrochloric acid, nor give a blue colour with iodine.

Operation.—Elaterium is the most powerful hydragogue cathartic we possess. Its operation is accompanied by nausea, mostly by vomiting, as well as more or less griping pain. It gives rise also to a great deal of thirst, and its action is followed by considerable depression and debility; feelings which, depending as they do on the diminished amount of watery fluid in the blood, are generally not long in being recovered from. Its abuse occasions gastro-enteritis, like other irritant medicines long-continued, or administered in too large doses.

Uses.—Almost the only use to which it is applied is to evacuate the fluid in *dropsy;* and, where the system is not too weak to bear the remedy, it is for the most part much more efficacious

than diuretics. In ascites, however, it often fails until tension of the abdomen has been relieved by tapping; but as soon as the patient has recovered from the first effects of the operation, elaterium should be resorted to as the most probable means of preventing the reaccumulation of the fluid. Its use is no bar to the simultaneous administration of tonics and iron. The faintness which accompanies its action may sometimes require a temporary stimulant to be exhibited for its removal. Griping is in a great degree obviated by the combination of a few grains of ginger. It may be employed in other cases like colocynth.

DOSE.—Grs. $\frac{1}{10}$—$\frac{1}{2}$. The smaller doses are only efficacious when the drug is *very* good.

CAPRIFOLIACEÆ.

SAMBUCUS NIGRA.—The Common Elder.

Pentandria, Trigynia.

[A shrub, with woody stems, and pinnatisect, smooth leaves the segments are ovate, lanceolate, serrate. The flowers are white, in quinque-partite corymbs. The berries are purplish-black, on reddish footstalks. The leaves have an unpleasant odour when bruised.

Hab.—Indigenous in Europe; in the United States it is represented by the S. canadensis, which has the same properties.]

SAMBUCUS (*Flores, L.*)

The well-known cymes of white flowers borne by the elder, are the officinal part of the plant. Their only value depends on the presence of volatile oil.

OFF. PREPS.—*Oleum Sambuci. L.* (Prepared as oleum carui.) Quite useless.

Aqua Sambuci. L. (Prepared as aqua carui.) A flavouring and perfuming ingredient.

Unguentum Sambuci. L. (Elder flowers are boiled in lard, and then pressed.)

CINCHONACEÆ.

CINCHONA.—Species of Cinchona yielding Peruvian Bark.

Pentandria, Monogynia.

Hab.—The Andes.

CINCHONA. U. S. (*Cortex. L.*)

DESCRIPTION.—There are several varieties of cinchona bark, which are commonly classed under three heads:—1. The *pale* or crown bark of Loxa; 2. The *yellow* or Calisaya or regia bark; and, 3. The *red* bark.

1. PALE BARK.

Form, in quills, single or double. *Size*, from $\frac{1}{2}$ a foot to $1\frac{1}{2}$ feet long, and $\frac{1}{4}$th of an inch to a little more in breadth; thickness, $\frac{1}{20}$th to $\frac{1}{6}$th of an inch. *Epidermis*, cracked transversely and longitudinally. *Colour* of the exterior, gray or brown; of the inner surface, pale fawn or cinnamon. *Fracture*, the smaller pieces clean, the larger fibrous.

Species yielding it:—

1. C. *Condaminea* (quilled bark of Loxa).
2. C. *ovata* (gray bark of Loxa).
3. C. *micrantha* (bark of Lima).

The London College attributes this bark to the C. *lancifolia.*

The salt which gives it activity, is the kinate of cinchonia.

2. YELLOW BARK.

Form, in quills and flat pieces. *Size*, of various lengths, $\frac{1}{2}$ an inch to two inches in breadth, the thickness being greater than that of pale bark. *Epidermis*, cracked transversely, rendering it very rugged, especially in the larger pieces: there is none on the flat pieces. *Colour* of the exterior, tawny grayish-brown; of the inner surface, a yellow fawn. *Fracture*, fibrous, a yellow fibrous powder falling out.

Species yielding it:—

1. C. *lanceolata* (ordinary Calisaya bark).
2. C. *cordifolia* (hard Carthagena bark).

The London College attributes this bark to the C. *cordifolia.*

The salt which gives it activity, is the kinate of quina. It contains also the kinate of cinchonia, but in smaller quantity.

3. Red Bark.

Var. *a*. Smooth red bark. *Form*, in quills and flat pieces. *Size*, 12 inches and less in length. *Epidermis*, rough, transversely cracked. *Colour*, red. *Fracture*, fibrous.

Var. *β*. Warty red bark.—*Form*, in thick quills. *Epidermis*, warty, and deeply cracked transversely. *Colour* of the interior, a deep red. *Fracture*, fibrous.

Species yielding it, unknown. Supposed to be the C. *magnifolia.*

The London College attributes this bark to the C. *oblongifolia.*

The salts which give it activity, are both kinate of quina and kinate of cinchonia, in equal quantities.

Cryptogamic Plants found on the barks.—The *lichens* are the most important of these, and have been applied as a test of the goodness of specimens of bark. They are most abundantly found upon the pale varieties, and least upon the red. The pale or crown bark is sometimes thickly beset with them. They are sometimes *stringy*, as those which belong to the genus Usnea; or they may be *crustaceous*, coating over the surface of the epidermis, and giving to the gray varieties of bark the epithet they bear: others are *pulverulent:* while a fourth kind embraces the *foliaceous* forms. The presence of species of the genera Collema and Parmelia, which are foliaceous, is considered a bad indication.—*Jungermanniæ* and *fungi* occur also on the inferior barks.—The *mosses* which are met with on bark are not well understood.

Commercial Source.—Arica, Valparaiso, Lima, etc.

Chem. Comp.—In addition to the ordinary constituents of barks, such as lignin, starch, gum, fatty and colouring matters, the cinchona barks contain several peculiar principles, two alkaloids —*quina* and *cinchonia*,—an acid called the *kinic*, and other principles not yet fully determined.

1. *Cinchonia.*—An alkaloid existing in all the barks, being in largest quantity in the pale varieties. It occurs in the form of a kinate, and is obtained by processes similar to those for quina: when pure, it forms large brilliant four-sided prisms, very little soluble in water or ether, but more readily in strong alcohol. It

forms crystallizable salts with most of the acids, which are soluble in water, have a very bitter taste, and are used for the same purpose as those of quina.—*Formula*, $C^{20} H^{12} N O$.—The solutions of its salts are precipitated by *tannic acid.*

2. *Quina.*—This alkaloid also exists in all the cinchona barks, being most abundant in the yellow varieties. It may be obtained by precipitating the disulphate of quina by ammonia. It occurs in the form of a white amorphous powder, readily fusible into a resinous mass, but is with difficulty procured in crystals. It is soluble in water and ether, as well as alcohol. It forms crystallizable salts with most acids.—*Formula*, $C^{20} H^{12} N O^{2}$.—The solutions of its salts are precipitated by *tannic acid.* Quina differs from cinchonia in not readily crystallizing, in being much more soluble in water, and also in ether; while, on the contrary, its salts are much less soluble in water than the corresponding salts of cinchonia.

Two other alkaloids have been described as existing in some varieties of bark, namely, aricina and chinoïdine.—*Aricina* is said to differ from quina in the possession of one atom more oxygen, its formula being $C^{20}H^{12}N O^{3}$.—*Chinoïdine* is but little understood; and it is doubtful whether it is a distinct alkaloid.

3. *Kinic Acid.*—This acid exists in all the cinchona barks, and is obtained from the kinate of lime, a salt formed in extracting the alkaloids. It crystallizes in oblique rhombic prisms, and is very soluble in water and alcohol, and all its salts are soluble except those with lead. *Formula*, $HO, C^{14}H^{11}O^{11}$.

4. *Kinovic Acid* has been found in some varieties of bark. It is very similar to stearic acid.

5. *Tannic Acid* exists in the cinchona barks, especially in the most valuable kinds, and is contained in the so-called (soluble) *red colouring matter.*

6. *Red Cinchonic.*—A substance supposed to be *tannin* altered by the atmosphere, nearly insoluble in water, but soluble in hot alcohol. Little is known of it.

7. *Volatile Oil.*—A trace of thick essential oil is yielded by submitting the barks to distillation with water.

Chem. Rel.—The infusions of cinchona bark possess an *acid reaction.* Tincture of nut-galls, or solutions containing *tannic acid,* throw down a precipitate of the tannate of the alkaloids.

A solution of *gelatine* is precipitated from the tannic acid contained in the bark, forming tanno-gelatine. *Tartar emetic* is thrown down from the same cause; while a dark green colour is struck in the solution by the *salts of iron*. *Oxalate of ammonia* causes a precipitate in the infusions, from their containing lime.

In prescribing the various preparations of bark, it is necessary to avoid their combination with substances incompatible either with tannic acid or the alkaloids.

Adulterations.—Cinchona barks are the subjects of fraud in three principal ways. 1. The substitution of barks not of the genus cinchona at all, and containing neither of the alkaloids, cinchonia, or quina. 2. The mixture of the inferior with the finer varieties. 3. The mixture of inert powdered barks with the true powder. The external and *sensible qualities* of the barks and powder may be used in the detection of the two latter, while the quantity of precipitate with *oxalate of ammonia*, indicating the amount of lime in the yellow bark, is a guide to the probable quantity of quina; since it is found that these bear a pretty close proportion the one to the other. The first case mentioned, namely, the entire replacement by a false bark, is seldom, if ever, met with in this country. The *precipitation* of the alkaloids themselves by tannic acid, or the more tedious process of their *extraction*, may also be employed to determine the amount of them in a given specimen of bark.

Operation.—Of all the remedies included amongst *tonics*, cinchona is universally admitted as by far the most powerful in operation. It accordingly possesses in the highest degree those effects upon the system which have been ascribed to this class of medicines, increasing the muscular energy, as well as the force and fulness of the pulse, in a more remarkable manner than any other tonic in the Materia Medica. But although its principal value is dependent on this operation, it is rendered *astringent* by the tannic acid it contains, while *aromatic* properties are imparted to it by the presence of some essential oil. Since its first introduction into European practice near the middle of the seventeenth century, it has been celebrated for its *antiperiodic* powers; and the succeeding experience of 200 years has only added to its reputation, and stamped upon it the character of being unsur-

passed in the cure of intermittent diseases. With some persons, however, unpleasant effects arise from even moderate doses of bark; nausea and headache, with more or less feverishness and thirst, not unfrequently following upon its use. Under these circumstances the alkaloids are to be preferred to the ordinary preparations of bark, since they less commonly give rise to the same disagreeable results. When large doses of bark, however, are swallowed, all these symptoms appear in an aggravated degree, determination of blood to the head, with a flushed countenance, ringing in the ears, and rapid pulse, indicating its excitant action upon the vascular and nervous systems; while loss of appetite, vomiting, and relaxed or constipated bowels, manifest its injurious effects upon the digestive functions.

Uses.—The barks, in substance, and in their Galenical preparations, have been in a great measure superseded in actual practice by their *alkaloids;* but still circumstances frequently arise in which their exhibition is to be preferred. Quina is sometimes too powerful a tonic to be borne by the stomach of a debilitated patient; and where this occurs, the use of the infusion or decoction of cinchona is advisable as preparatory to its employment. Sometimes again, though rarely, the disulphate of quina disagrees, producing headache whenever it is taken; and then the Galenical preparations are often readily borne: but the opposite of this is for the most part observed. Of all the varieties of bark, the yellow is most commonly preferred. We refer to the head of Disulphate of Quina, for all that further respects its therapeutical employment.

Dose.—Of powdered bark, grs. x.—ʒij., according to the operation desired, the larger doses being sometimes administered for the production of its antiperiodic effects.

Off. Preps.—*Decoctum Cinchonæ Cordifoliæ. L.* (Yellow bark, bruised, ʒx., and boiled with distilled water, Oj., for ten minutes, and strained.) This and the following decoctions, as they cool, precipitate tannic acid and the kinates; and on this account either mucilage should be used to suspend them in a mixture, or the water with which the decoction is made should be acidulated with sulphuric acid, so as to form soluble salts of the alkaloids. *Dose*, f℥j.—ij.

Decoctum Cinchonæ Lancifoliæ. L. (Prepared with pale bark as above.) *Dose*, as the last.

Decoctum Cinchonæ Oblongifoliæ. (Prepared with red bark as above.) *Dose*, as the last.

Extractum Cinchonæ Cordifoliæ. L. (Yellow bark bruised, ℥xv., is to be boiled several times in distilled water, *cong.* iv., the decoction strained while hot, and evaporated to a due consistence.) *Dose*, grs. v.—xx.

Extractum Cinchonæ Lancifoliæ. L. (Prepared with pale bark, as the preceding.) *Dose*, the same.

Extractum Cinchonæ Oblongifoliæ. L. (Prepared with red bark as the former.) *Dose*, the same.

Infusum Cinchonæ. L. U.S. (Pale bark, bruised, ℥j., and macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥j.—iij.

Tinctura Cinchonæ. L. U.S. (Yellow bark bruised, ℥viij., [℥vj., U.S.,] and macerated in proof spirit, Oij., and strained.) *Dose*, f℥j.—iij.

Tinctura Cinchonæ Composita. L. U.S. (Pale bark, bruised, ℥iv., [℥ij., U.S.,] orange peel, ℥iij., [℥jss., U.S.,] serpentary, bruised, ʒvj., [ʒiij. U.S.,] saffron, ʒij., [and red Saunders each, ʒj., *U.S.*,] and powdered cochineal, ℈ij., macerated in proof spirit, Oij., [℥xx., U.S.]) *Dose*, fʒj.—iij.

The only preparation of the alkaloids introduced into the London Pharmacopœia, is the *disulphate of quina.*

Quinæ Di-Sulphas. L. *Quiniæ Sulphas. U.S.*

Prep.—Bruised *yellow* bark is boiled in water acidulated with *sulphuric acid;* the kinate of quina it contains becomes thus rendered soluble, and we obtain a solution containing sulphuric acid, kinic acid, and quina, mixed with colouring matters, etc. *Hydrated oxide of lead* is then added nearly to saturation, and precipitates all the sulphuric acid as an insoluble sulphate of lead, leaving kinate of quina in solution. The fluid being separated, *ammonia* is added, which forms a soluble kinate of ammonia, while quina becomes thrown down. The precipitated quina being washed, saturated with sulphuric acid, purified by animal charcoal, and evaporated, forms crystals of the disulphate of

quina. Manufacturers in this country generally employ *lime* in this process.

Props.—This salt consists of 2 eqs. of *quina*, 1 eq. of *sulphuric acid*, and 8 eqs. of *water*. It occurs in the form of snow-white feathery crystals, of a bitter taste, little soluble in cold water or ether, but more so in boiling water and alcohol. The *neutral* sulphate is readily formed from it by the addition of sulphuric acid. It occurs in square prisms.—Cinchonia can readily be separated from quina, as the solubility of the two alkaloids and their salts differs.

Adulteration.—*Gypsum* or *sulphate of lime*, *chalk*, *magnesia*, *boracic* and *stearic acids*, *sugar*, *gum*, *starch*, *mannite*, and *salicine*, are frequent adulterations. The three first can be easily detected from their insolubility in alcohol: *boracic acid* is known by tinging the alcoholic flame green; the *sugars* are taken up by cold water; *stearic acid* is not dissolved by the diluted acids; *starch* is detected by iodine; and *salicine* is turned red by the addition of strong sulphuric acid.

Operation.—The effects of quinine upon the animal economy are so closely allied to those of the barks which yield it, that, with the exception of the astringency of the latter, no material difference can be found between them. The small bulk of an efficacious dose, and the consequent readiness with which it may be augmented to any degree, as well as other circumstances, have led to its almost universal adoption in cases where the other preparations of bark were accustomed to be employed. The administration of this salt in very large doses occasions the same evil consequences as the barks themselves; throbbing and distensive headache, a flushed countenance, giddiness, nausea, or vomiting, following as the result of its abuse.

Uses.—1. The most important of the therapeutical applications of quina is to the cure of *intermittent fever*, for which, if arsenic be excepted, it is perhaps without a rival. The mode of its administration, however, varies; some preferring its exhibition in a *single large dose* just before the accession of the paroxysms, while others consider that *small and repeated doses* are more efficacious, when taken during the apyretic interval. We are not in a condition to give our experience upon this head,

although we have seen quotidian ague of considerable duration, suddenly put a stop to by a single large dose of the salt. We have generally, however, adopted the latter of these alternatives. It has been stated, also, that the enlargement of the spleen, which accompanies the fit, is remarkably influenced by a dose of quina, a short time only elapsing before its size is considerably reduced. Its use, however, in ague ought not to be empirical, some judgment being exercised, not only in selecting the cases, but also in preparing the patient for its successful use. The inflammatory form of the disease thus requires the previous application of some degree of antiphlogistic treatment, and even blood-letting to a considerable extent may occasionally be demanded. Mostly, however, topical bleeding in the intervals is sufficient for the removal of local inflammations, and, when present to any amount, we would prefer the use of *arsenic* to that of quina as the antiperiodic. Occasional emetics and purgatives are also valuable adjuncts to the treatment of the more sthenic forms of the complaint, while its assumption of a malignant type requires the system to be supported by wine, as well as stimulant and aromatic medicines.

2. The distinction between intermittent and *remittent fever* lies in the prolongation of one febrile paroxysm, across the apyrexial interval to the commencement of the next: so that, although at that time there is less intensity of the symptoms, yet no distinct cessation of fever occurs in the course of the day or night. Many quotidian agues closely resemble the remittents in this respect; heat of skin, thirst, headache, and a quick pulse, continuing after the occurrence of a more or less imperfect sweat. It is at this period that we administer quina; and it is when exhibited at the analogous period, namely, the remission, that it proves of service in the cure of a remittent. It must be kept in mind that both these diseases have their origin in the same source, which is *marsh malaria;* the kind of fever which ensues being rather dependent on the strength of the aerial poison, as modified by climate, than on any essential difference in the nature of the poison itself. We are, moreover, encouraged to the use of quina, by the consideration that here, as in ague, those who are from any cause debilitated, or in a disheartened state, are the individuals most likely to be attacked.

3. It has also been employed in *continued fever*, but with less favourable results. It is in the convalescence of fever-patients that its utility is most obvious, improving the appetite and aiding the restoration of muscular strength.

4. *Inflammations* sometimes put on an intermittent type, or, when this is not the case, arise in such an asthenic condition of the general system as quina is calculated to counteract. Rheumatism and erysipelas afford examples of the latter, as well as some other local diseases allied to them in their general character. Although manifesting the "rubor, et tumor, cum calore, et dolore," we may perhaps be permitted to question whether these affections are not more closely allied, in their earlier stages at least, to the class of determinations of blood, than they are to the true inflammations; but, be this as it may, they are often, in a remarkable manner, under the curative control of quina. *Erysipelas* and *erythema*, occurring in scrofulous and debilitated individuals, rapidly disappear beneath its use; and its employment in *acute rheumatism* has also met with considerable success. We would hesitate to exhibit it, as some have done, where the excited state of the circulation rather indicates active depletion than tonic medicines; but, after its impetus has been reduced by blood-letting and purgatives, even when the pulse remains quick with some fever continuing unsubdued, quina is a most useful remedy. *Chronic inflammations*, connected, as they are sometimes, with a weakened state of constitution, are, for the most part, more benefited by its use than the acuter forms of the disease.

5. *Various nervous affections*, met with in debilitated subjects, especially when occurring periodically, are successfully treated by bark or quina. *Neuralgia*, *toothache*, *headache*, *chorea*, *amaurosis*, etc., have been in this way signally benefited by their use. Hemicrania, however, yields more readily to *arsenic* and chorea to the *sesquioxide of iron*.

6. *Dyspepsia*.—It often proves efficacious in the atonic forms of this affection; but, for the most part, it has to be preceded by the use of some less powerful vegetable tonic. It is where the indigestion forms rather a part of the general debility of the system, than being a mere local complaint, that quina is most useful in its cure.

7. *Debility and Cachexia.*—We have had frequent occasion to refer above to a debilitated state of the general system, as inducing a variety of disorders curable by the administration of bark and quina. This debility itself, whether occurring as the result of insufficient food, close hot rooms, over-exertion, long-continued illness, or other causes of a weakening character, is most advantageously treated by them also. In ill-nourished and ill-lodged persons, moreover, a *variety of cutaneous affections* are liable to occur, such as eczema, rupia, ecthyma, etc.; the livid aspect of the latter, and their tendency to degenerate into unhealthy ulcers, often giving them a peculiar character. *Boils* and *carbuncles* also, as well as *inflammations and ulcerations about the cheeks, gums, and mouth*, are apt, especially in children, to appear under this atonic condition of the general health; and although, in all these cases, good air, nutritious food, and healthy lodgings, are most important remedial means, yet quina aids, in a surprising manner, the rapidity of the cure.

Dose.—Grs. j.—v., or larger in ague. It may either be made into pills with confection of roses, or administered in a draught, by aiding its solution with a few drops of a diluted mineral acid.

Cephaelis Ipecacuanha.—The Ipecacuanha Plant.

Pentandria, Monogynia.

[An herbaceous perennial, with a somewhat shrubby stem, two or three feet long, throwing out runners. Leaves, oblong, ovate, rough above, pubescent beneath, rarely more than four to six near the end of the stem or branches, furnished with stipules. Flowers in solitary globose heads, each 8 to 10-flowered; corolla, white. Fruit, a soft, fleshy, violet-black berry.]

Hab.—Brazils and New Granada.

Ipecacuanha. U. S. (*Radix.*) *L.*

Description.—*Form*, contorted root-like pieces, having a knotty appearance, in consequence of deep transverse fissures, which, passing down to the central woody axis, render the cortical por-

tion annulated. *Size*, three or four inches long, the diameter being under that of a goose-quill. *Structure*, it consists of a central woody axis and a cortical portion, which is fissured into rings and is the active part of the drug. *Colour* of the cortical part, brownish-gray. *Fracture* of the cortical portion, brittle and resinous. *Taste*, bitter and nauseous.

Commer. Source.—Rio Janeiro.

Chem. Comp.—*Lignin, starch, gum, wax, fatty matters* having a powerful odour, *gallic acid*, and an alkaloid called *emetina*. The central woody axis contains but small quantities of emetina and fatty matters.

Emetina.—This alkaloid, when pure, occurs as a white powder, readily soluble in hot water, but with difficulty in cold; it is very soluble in alcohol, but slightly so in ether and oil.—*Formula*, $C^{37}H^{27}NO^{10}$.—It is precipitated by *gallic* and *tannic acids*.

Chem. Rel.—*Solution of nut-galls or tannic acid* precipitates the decoction of ipecacuanha root, in consequence of combining with the emetina it contains. The presence of gallic acid also causes the *salts of iron* to strike a green colour with it, while *sub-acetate of lead* forms an insoluble precipitate with the gum, colouring matters, etc.

The above and similar matters are accordingly ranked among its *incompatibles*.

Operation.—The effect of ipecacuanha upon the system varies for the most part with the quantity administered. A full dose of ten or fifteen grains is generally emetic, the preceding nausea and depression, though considerable, being less than that induced by the antimonial tartar, while the vomiting itself is less violent and less continued. Its emetic action, however, appears sometimes to be modified by accidental circumstances, the same quantity one day vomiting a patient freely, and the next producing merely a little nausea and a purgative operation upon the bowels. This, indeed, often depends upon the period of its operation at which diluents are taken to assist it; but, even when these are most judiciously exhibited, we occasionally meet with the result alluded to. Ipecacuanha, moreover, more powerfully affects some persons than others, the small quantity in an ordinary dose of Dover's powder, notwithstanding the sedative influence of the opium, sometimes giving rise to an emetic effect. The vomiting pro-

duced by this drug is often followed by a disposition to sleep. Ipecacuanha is also diaphoretic and expectorant; these effects being most manifest, however, when the quantity taken has been sufficient to nauseate the patient.

Uses.—Ipecacuan is more fitted to unload the stomach in *acute dyspepsia,* than it is for administration at the commencement of febrile diseases. Still, however, when they occur in debilitated subjects, or in children, its employment is more safe than that of an antimonial emetic. It is also of very great value when commencing the treatment of the several affections of the respiratory organs to which children are subject. In *phthisis,* where it operates effectually, we prefer it to other emetics for daily use; its action not being violent, and not increasing the debility which prevails in that formidable complaint. In chronic bronchial affections, it is often advantageously combined with tartarized antimony. As a diaphoretic and expectorant, it is of service in a variety of diseases; among which *catarrh* and *dysentery* may especially be mentioned. In the latter disease, as it occurs in this city, we have found the most beneficial results to accrue from its employment in small and repeated doses, especially when combined with blue pill and extract of gentian. The ordinary forms of *diarrhœa* are similarly benefited by its diaphoretic operation; which should, in all these cases, be promoted by warm but light clothing.

Dose.—As an emetic, grs. x.—xxx. For other purposes, grs. j.—v.

Off. Preps.—*Vinum Ipecacuanhæ. L. E. U.S.* (Bruised ipecacuanha, ℥ijss. [℥ij. U.S.] macerated in sherry wine, Oij.) *Dose,* as an emetic, f℥iv.; for other purposes, ♏x.—xl. As an emetic for children, half a fluid ounce, or an ounce, according to the age, may be made into a two-ounce mixture with some syrup; and f℥j. taken every five or ten minutes, till vomiting be produced.

Pulvis Ipecacuanhæ Compositus. L. Pulvis Ipecacuanhæ et Opii. (Equal parts of ipecacuanha and opium, each, ℥j., mixed with sulphate of potash, ℥j.) The object of introducing the sulphate of potash, is to promote, by its hardness, the fine division of the vegetable drugs during trituration. This powder is com-

monly employed as a diaphoretic and narcotic. *Dose*, grs. x.—xxx. Ten grains contain one grain of opium.

Pilulæ Ipecacuanhæ Compositæ. L. (The compound ipecacuanha powder, ℈iij., beaten, by means of gum acacia, into a mass, with squill and ammoniacum, each, ℈j.) *Dose*, grs. v.—x.

Syrupus Ipecacuanhæ. U. S. (Bruised ipecacuanha, ℥j.; diluted alcohol, Oj.; syrup, Oij. Macerate the ipecacuanha in the alcohol, and filter, evaporate to f℥ij., and again filter, add the syrup and evaporate to a proper consistence.)

Dose.—f℥j.—ij.

[CORNACEÆ.

Cornus Florida.—Dogwood.

Tetrandria, Monogynia.

A small tree, with numerous crooked branches, which are opposite and spreading. The leaves are opposite, oval, entire, glaucous beneath. The flowers are terminal, appearing before the leaves are fully expanded; they consist of a large four-leaved involucre of a yellow-white colour. The true flowers are in the centre, small, and crowded. The fruit is an oval drupe, of a scarlet colour, with a central nut that is two-celled and two-seeded.

Hab.—In most parts of the United States.

Cornus Florida. U. S. (*Cortex.*)

Description.—*Form*, somewhat quilled fragments of various sizes, breaking with a short fracture. *Colour*, grayish-red externally, within somewhat mottled. *Odour*, feeble. *Taste*, bitter and astringent.

Chem. Comp.—Several analyses of this bark have been made, the most recent and perfect of which is by Mr. Cockburn. He found it to contain *oil, fatty matter, bitter extractive, wax, red colouring matter, lignin, some salts,* and a *peculiar crystalline substance.*

Oper. and Uses.—It is a tonic astringent of considerable

power, and has been advantageously employed as a substitute for cinchona in the treatment of intermittent fevers. The great objection to its use is that it requires to be given in large doses, and these disorder the stomach. It is given in powder, infusion, or decoction.

Dose.—In powder, ℈j.—ʒj.

Off. Prep.—*Decoctum Cornus Floridæ. U.S.* (Bruised dogwood bark, ℥ij.; water, Oj. Boil and strain.) *Dose*, f℥j.—iij.]

VALERIANACEÆ.

Valeriana Officinalis.—The Wild Valerian.

Triandria, Monogynia.

An annual herb, with a perennial root. It has a tall round channelled stem, terminated by a close corymbose head of white or lilac flowers. Its leaves are opposite and pinnate, the leaflets being lanceolate and serrated.

Hab.—In wet places in Europe.

Valeriana. U.S. (*Radix.*) *L.*

Description.—*Form*, a short tuberose rhizome, from which radical fibres come off, three or four inches in length, which are the officinal part. *Colour*, yellowish-brown, when dry. *Odour*, fœtid and peculiar, and not disagreeable in the fresh plant. *Tas e*, warm, camphoraceous, and nauseous.

Chem. Comp.—Its most important ingredients are, *volatile oil*, *valerianic acid*, *resinous* and *gummy* matters.

The *volatile oil* is obtained by distillation of the root with magnesia, in order to fix the valerianic acid. It is of a light-green colour, and lighter than water, having the odour of the valerian.

The *valerianic acid*, when set free from the magnesia by sulphuric acid, occurs as an oily liquid, having an odour similar to the oil, but an acrid acid taste. It is probably formed by oxidation of the oil. It can be procured artificially by oxidation of the *oil of potatoes* or *grain spirit*, to which it stands in the same

relation as acetic acid does to alcohol. It forms soluble salts, with bases, as oxide of zinc and quinine, which have lately been introduced into medicine. *Formula*, $HO+C^{10}H^{9}O^{3}$.

Oper. and Uses.—Valerian is stimulant and antispasmodic. We have found it of some value in removing the *paroxysms of headache*, which occur in atonic dyspepsia and anæmia. It has obtained a reputation in convulsive affections, as *epilepsy*, *hysteria*, and *chorea*. We have seen it of service in hysteria, but never in epilepsy.

Dose.—℈j.—ij.

Off. Preps.—*Infusum Valerianæ. L. U. S.*—(Valerian, ʒij. [ʒss. U. S.] macerated in boiling distilled water, f℥vij. [Oj. U. S.] and strained.) *Dose*, f℥j.—ij.

Tinctura Valerianæ. L. E. U. S. (Bruised valerian, ℥v. [℥iv. U. S.] macerated in proof spirit, Oij., and strained.) *Dose*, fʒj.—iv.

Tinctura Valerianæ Composita. L. Tinctura Valerianæ Ammoniata. U. S. (Bruised valerian, ℥v. [℥iv. U. S.], macerated in aromatic spirit of ammonia, Oij., and strained.) *Dose*, fʒß—ij. More stimulant than the two former preparations.

Valerianates.—Salts of Valerianic Acid.

Lately, salts have been introduced into medicine containing valerianic acid, united with various bases, as zinc and quinine. *Valerianic acid* can be prepared in two ways, either from the root of the valeriana officinalis by distilling it with water, when the acid, being volatile, passes over along with the volatile oil, and can be neutralized by an alkali, and the impure salt redistilled with sulphuric acid to obtain the acid pure; or it may be obtained from the oil of potatoes, by heating it with caustic potash. Its composition is $HO+C^{10}H^{9}O^{3}$.*

* The explanation of these processes is as follows:—1. In the valeriana officinalis this acid exists ready formed, or is formed from some of the constituents of the root, probably the volatile oil; and, being volatile, it passes over by simple distillation with water. 2. Oil of potatoes, called also Fousel Oil, passes over towards the end of the process for obtaining spirit from grain or potatoes. When pure it forms a colourless oily liquid, of a disagreeable odour. It has the composition $C^{10}H^{12}O^{2}$, or may be better represented by $C^{10}H^{11}O+HO$, that is, as a hydrate of an oxide of a radical

When pure, it occurs as a colourless oil, lighter than water, having the strong disagreeable *odour* of the valerian, and an acrid *taste*. It is inflammable, and burns with a white smoky flame. Its salts are generally soluble in water and crystallizable. A pound of valerian root yields about half a drachm of the acid.

Valerianate of Zinc.—This salt is prepared by dissolving *valerianic acid* in water, and neutralizing with freshly-precipitated *carbonate or oxide of zinc*, a gentle heat is then applied, and the solution concentrated, and allowed to crystallize. It occurs in white laminæ, very thin, with a mother-of-pearl lustre, dissolving in 160 parts of water or in about 60 parts of alcohol; little soluble in cold, but soluble in 20 parts of boiling ether. *Composition*, 1 eq. of valerianic acid+1 eq. of oxide of zinc.

Valerianate of Iron.—Made by adding a solution of the perchloride of iron to a solution of the valerianic acid, saturated with carbonate of soda. A precipitate falls, which must be dried under 70° F. It occurs as an amorphous powder, of a dark red colour. By heat it is decomposed, the valerianic acid passes off, and peroxide of iron remains. *Composition*, 3 eqs. of peroxide of iron+7 eqs. of valerianic acid+2 eqs. of water.

Valerianate of Quinine.—Made by adding freshly-precipitated quina to a hot solution of valerianic acid, and then crystallizing. It crystallizes in thin colourless rhomboidal plates, of a mother-of-pearl lustre, or in needles. Not very soluble in water, but more so in alcohol and ether. It has a smell of valerianic acid, and a very bitter taste. *Composition.* 2 eqs. of quina+1 eq. valerianic acid+24 eqs. water.

When a solution is heated above 122° F., it gives rise to the formation of a resinous mass, having the composition, 2 eqs. quina+1 eq. valerianic acid+4 eqs. water.

Oper. and Uses.—The valerianates of zinc, iron, and quinine appear to possess the combined properties, both of the acid and the bases. Thus the valerianate of zinc has been extolled in

$C^{10}H^{11}$, which is called amyle. Hence, this Fousel Oil is called the alcohol of the amyle series; and as acetic acid ($HO+C^4H^3O^3$) is formed from common alcohol ($C^4H^6O^2$) by the addition of 2 eqs. of oxygen and the subtraction of 2 of hydrogen, so valerianic acid is formed from the oil of potatoes by a similar change, and has been called the acetic acid of the amyle series.

nervous diseases, as epilepsy, chorea, tic-doloreux, and other forms of neuralgia; the valerianate of quina, in intermittent diseases. The high price of these preparations must be a serious obstacle to their coming into general use.

Oil of Valerian passes over with valerianic acid, when valerian root is distilled with water. When fresh, it contains no valerianic acid, but consists of several compounds; one called valerole ($C^{12}H^{10}O^{2}$), crystallizable, which yields valerianic acid by exposure to the air, or when treated with an alkali; the second called Bornéene ($C^{10}H^{8}$), identical with the liquid from Borneo camphor; and also a crystallizable camphor, like Borneo camphor ($C^{20}H^{18}O^{2}$).

COMPOSITÆ.

Tussilago Farfara.—The Coltsfoot.

Syngenesia Polygamia superflua.

This plant is commonly the first to appear upon soil turned up from a considerable depth, and the flowers present themselves in the spring before the leaves. The flowers are yellow, and each head is placed singly at the extremity of a scape covered with imbricated bracts. The leaves are cordate, angular, toothed, and downy on the under surface. The whole plant is mucilaginous to the taste.

Hab.—Various parts of Europe and Asia.

Tussilago. L.

The whole plant is officinal, and may be used dry or fresh.

Oper. and Uses.—It is demulcent, and perhaps slightly tonic. It has enjoyed a reputation as a tonic and expectorant in phthisis and chronic bronchitic affections.

Dose.—A decoction of the plant may be taken *ad libitum.*

Inula Helenium.—Elecampane.

Syngenesia Polygamia superflua.

An herbaceous plant, with a perennial root, having an erect

stem, rising 3 or 4 feet in height. It has large, ovate, dentated leaves, tomentose on the under surface. The heads of flowers are large, yellow, and terminal, the involucrum being imbricated in several rows, and the florets of the ray ligulate and in a single row.

Hab.—In Europe; naturalized in some parts of the United States.

INULA. U.S. (*Radix. L.*)

DESCRIPTION.—*Form*, in transverse and sometimes longitudinal slices, of a yellowish-gray *colour*, aromatic *odour*, and warm, bitter taste.

CHEM. COMP.—It contains *volatile oil*, and, besides this, a peculiar amylaceous substance called *inulin*, as well as *resin* and a *bitter matter*.—The *volatile oil* is a solid, similar in most of its properties to camphor, and called *helenin* (C^7H^5O).—*Inulin* is a peculiar kind of starch, distinguished by giving a *yellow* colour with iodine, and being slightly soluble in alcohol. It is found in some other roots, and in lichens.—*Formula*, $C^{24}H^{21}O^{21}$.

OPER. AND USES.—Stimulant and aromatic. Scarcely ever administered.

[EUPATORIUM PERFOLIATUM.—Boneset.

A perennial, herbaceous plant, with an erect, hairy stem, simple below, divided above. The leaves are opposite, connate, perfoliate, broad at base, becoming gradually narrower to the point, rugose, tomentose beneath, of a grayish-green colour. The flowers are white, in a close, flat corymb. The seed is smooth and glandular, with a scabrous pappus.

Hab.—Throughout the United States, in wet places.

EUPATORIUM. U.S.

DESCRIPTION.—Either in bundles of the whole plant, dried, or in compressed packages of the leaves and flowers. *Odour*, rather pleasant. *Taste*, very bitter.

CHEM. COMP.—No accurate analysis has been made of it. The medical properties reside in extractive, that is soluble in water and alcohol.

Oper. and Uses.—Boneset acts very differently, according to its mode of administration. In a powder, or cold infusion, it is a tonic, and well suited to all cases where the mild vegetable bitters are required; in warm infusion, in moderate doses, it is an excellent diaphoretic, and has proved eminently successful in a variety of diseases where this indication is to be fulfilled; in larger doses, the warm infusion operates as an emetic. No one of our native remedies has proved of more benefit, both in regular and domestic practice, than the boneset.

Dose.—Powder, ℈j. Infusion, made with ℥j. of plant to Oj. of boiling water, ℥j.—℥ij.]

Anthemis Nobilis.—The Common Chamomile.

Syngenesia, Polygamia superflua.

A well-known herb, with a perennial root, and a short, prostrate stem. The leaves are pinnatisect, and each segment is split into linear lobes. The branches are each terminated by a single flower, the florets of the ray being white and ligulate, those of the disk yellow. The involucrum is imbricated in a few rows, and the receptacle convex. The whole plant possesses a fragrant, aromatic odour. When cultivated for medicinal use, the stem is more erect, and the flowers frequently double.

Hab.—Europe; said to be naturalized in one or more places in the United States.

Anthemis. U. S. (*Flores.*) *L.*

Description.—Although the double flowers are for the most part found in the shops, the single are those which should be employed, since they contain the largest amount of volatile oil, residing, as this does, in the florets of the disk. Their *odour* is strong and peculiar, and their *taste* bitter, aromatic, and warm.

Chem. Comp.—The useful constituents of chamomile flowers are a *volatile oil*, a *bitter extractive*, and a trace of *tannic acid*. *Oil of chamomile* is of a blue colour, lighter than water, and consists of two principles, a hydrocarbon and an oxidated oil. Dr. A. T. Thomson states that he has obtained *piperina* from them (?). See Pepper.

Oper. and Uses.—Chamomile flowers are aromatic and tonic, possessing these properties in a degree which renders them a very valuable medicine. When the infusion is taken warm, it often proves emetic. As a tonic, it is of special service in *atonic dyspepsia*, and principally in an acute attack to restore the digestive power of the stomach, after all crudities have been evacuated from it by an emetic. Warm chamomile tea is well adapted even for the latter purpose, since, when the stomach is loaded with undigested food, nothing is easier than to induce vomiting, and the simpler the means employed for the purpose the better. It is also drunk, in place of warm water, to aid the effect of other more powerful emetics. It is, moreover, reported to possess antiperiodic powers.

Off. Preps.—*Infusum Anthemidis. L. U.S.* (Chamomile, ℥v., [℥ss., U. S.,] macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥ij.—iv.

Oleum Anthemidis. L. (Prepared as oil of anise.) Used like other volatile oils. *Dose*, ♏j.—v.

Anacyclus Pyrethrum.—Pellitory of Spain.

Syngenesia, Polygamia superflua.

A herbaceous plant, having several procumbent stems. Its leaves are pinnatisect, the segments pinnated with linear subulate lobes. The flowers are large, and terminate the branches, the florets of the disk are yellow, while those of the ray are white on the upper side, and purple on the under. The root is fusiform, and has a hot and pungent taste.

Hab.—Arabia, Syria, and some parts of Europe.

Pyrethrum. U. S. (*Radix.*) *L.*

Description.—It is met with in pieces about the *size* and thickness of the little finger, of a brown *colour*, studded with black shining spots. *Fracture*, resinous. *Odour*, none. *Taste*, hot and pungent, increasing the secretion of saliva.

Commercial Source.—The Levant.

Chem. Comp.—It contains some *resin* and *oil*, to which it owes

its acridity, and, in addition, a little *tannin*, *starch*, and *lignin* exist in the root.

Oper. and Uses.—It is employed as a masticatory, to relieve toothache and facial neuralgia; being a powerful local irritant, it increases the secretion of saliva when chewed.

Artemisia Absinthium.—The Common Wormwood.

Syngenesia, Polygamia superflua.

A perennial under-shrub, with numerous branches, seldom rising more than two feet in height, the stalks are channelled and somewhat downy. Its leaves arc tri-pinnatisect, with obtuse lanceolate segments, green on the upper surface, silky and hoary on the under. The heads are small, racemose, paniculate, globose, and nodding, of a brownish-yellow colour; the exterior scalcs of the involucrum being silky.

Hab.—Europe, cultivated in the United States.

Absinthium. L. U. S.

The whole plant is officinal, and, when dried, has a soft feel, whitish-gray *colour*, and very bitter *taste*.

Chem. Comp.—It contains *volatile oil*, *absinthic acid*, and a *bitter extractive* matter. The *volatile oil* is lighter than water, acrid, and has the peculiar odour of the plant. *Absinthic acid* is uncrystallizable, deliquescent, and precipitated by acetate of lead. It forms a crystallizable salt with ammonia. The *bitter extractive*, called sometimes *absinthine*, remains after an infusion of the herb has been precipitated by acetate of lead. It is this which imparts its intense bitterness to wormwood.

Oper. and Uses.—Wormwood is a very useful tonic, and equally applicable to the cure of dyspeptic affections, with others much more expensive. It has been reputed antipcriodic also.

Dose of the powder, ℈j.—ʒj. It is best given in the form of infusion.

Taraxacum Dens-Leonis.—The Common Dandelion.

Syngenesia, Polygamia æqualis.

This is a well-known indigenous herb, every part of which abounds in a milky juice. Its leaves are radical and runcinate, and their lobes triangular and toothed. The flowers, which only expand in the morning and in the sunshine, are placed singly at the end of long radical hollow stalks; their florets are ligulate, of a yellow colour, and the involucrum double, its external scales being reflexed.

Taraxacum. U. S. (*Radix.*) L.

Description.—The root is tap-shaped and branched, and, when cut across, pours out a milky juice. It has a bitter taste. The extract it yields is largest in quantity in the winter, but is much more bitter in April or May.

Chem. Comp.—The *milky juice* of the root contains *caoutchouc, resin, bitter extractive, sugar, gum,* and a vegetable acid. The *root* itself contains *inulin.* It seems to owe its medicinal power to the extractive.

Oper. and Uses.—A variety of operations have been ascribed to taraxacum; and it has been said not only to possess tonic properties, which is probably the case, but also to increase the biliary and urinary secretions. In order to obtain any good result from its employment, however, it requires to be administered in larger doses than are commonly prescribed. Dr. Todd considers that "when given in an efficient formula it is a most valuable remedy" in the inflammatory variety of *duodenal dyspepsia* (*Cyc. Pract. Med.*, art. *Indigestion*), but, having frequently used it as he advises in this form of disease as well as in gastritic dyspepsia, we are disposed to regard the nitre as the most efficient ingredient in the formula he recommends. It is also employed empirically in various *chronic cutaneous and visceral diseases.*

Off. Preps.—*Extractum Taraxaci. L. U. S.* (Prepared as extract of gentian.) *Dose*, grs. x.—ʒß, or more.

Lactuca Sativa.—The Garden Lettuce.

Syngenesia, Polygamia æqualis.

This well-known plant is commonly cultivated for the table. Its stem is erect and leafy, the leaves being ovate, semi-amplexicaul, toothed and entire. The flowers are yellow and panicled, and the whole plant abounds when full-grown in a bitter milky juice.

Lactucarium. U. S. (*Succus spissatus.*) L.

Description.—It occurs in roundish hard masses, of a brown *colour*, and *odour* similar to opium: its *taste* is bitter and disagreeable.

Preparation.—Transverse incisions are made in the stem, and the milky juice which pours out is scraped off, collected in a porcelain vessel, and dried. It is found that the wild lettuce (*lactuca virosa*) yields, on an average, three times as much lactucarium as the garden variety.

Chem. Comp.—Little is known with respect to its composition, but, according to analysis, a large quantity of *bitter extractive*, slightly soluble in water but soluble in alcohol, has been found in it. It contains also an *odorous principle*, similar to opium, and was at one time supposed to contain morphia.

Oper. and Uses.—Lactucarium is believed to possess the narcotic powers of the plant, its operation being like henbane, rather of a sedative than a hypnotic nature: it is calculated to fulfil similar indications to that drug.

Dose.—Grs. iij.—v., or more.

Extractum Lactucæ. L.—(Prepared as extractum aconiti.)

Lactuca Virosa. E.—The Strong-scented Lettuce.

Syngenesia, Polygamia æqualis.

A biennial herb, having an erect, round stem, terminating in a panicle of small yellow flowers. Its leaves are horizontal, finely toothed, with a prickly keel, and the entire plant is of a dark green colour, and abounds in a fœtid milky juice.

This plant has already been alluded to as a source of lactucarium.

LOBELIACEÆ.

Lobelia Inflata.—The Bladder-podded Lobelia.

Pentandria, Monogynia.

This is an annual, with an erect angular stem and hairy leaves, irregularly serrated, and varying somewhat in shape in the middle and lower parts of the stem, the former being acutely ovate and sessile, the latter blunt and with a short petiole. The flowers are small, blue, and racemose, with a bi-labiate corolla and 5-lobed calyx, the tube being ovoid and the segments linear. The capsule is ovoid and inflated.

Hab.—A common weed in the United States.

Lobelia. L. U. S.

Description.—The whole herb is officinal, and is found in the dried condition, made up into cakes of a rectangular *form.* It has a greenish-yellow *colour,* nauseous *odour,* and burning, acrid *taste.*

Chem. Comp.—Dr. Pereira has found in this herb an *acrid volatile oil,* and an acid called *lobelic,* a *resin,* etc. A principle, moreover, called *lobelina,* has been stated to exist in it. [For a full investigation of the constituents of lobelia,—see papers by Mr. Wm. Procter, in Amer. Journ. Pharm. ix. and xiii.; and for an abstract of them,—Dr. Carson's edition of Pereira's Elements of Materia Medica, ii. 395, 2d edit.]

Oper. and Uses.—Lobelia appears to be sedative, antispasmodic, and expectorant, resembling tobacco very much in its action upon the economy. In large doses, it gives rise to nausea, excessive prostration, a languid and sometimes intermittent pulse, vomiting, and diaphoresis. Its depressing effects may terminate fatally. It has been chiefly celebrated for the cure of *spasmodic asthma* and *convulsive coughs,* in which cases it has been administered with considerable success.

Dose of the powder, grs. j.—v., or of a tincture made by macerating ℥iv., in Oij., of proof spirit, ♏x.—f℥j.

ERICACEÆ.

Arctostaphylos Uva Ursi.—The Bear-berry.

Decandria, Monogynia.

A very short trailing shrubby plant, indigenous to the northern parts of this country. It has evergreen leaves, rather closely set around the upper part of the stalk; they are coriaceous, obovate, and entire. The flowers are disposed in small terminal racemes, the corolla being smooth, rose-coloured, oval, and contracted.

Uva Ursi. U. S. (*Folia.*) *L.*

Description.—The dried leaves are of a deep green *colour*, glossy on the upper surface and reticulated on the under. When powdered, the *odour* is something like that of hay, and the *taste* is bitterish and astringent.

Chem. Comp.—Its medicinal activity appears due to the possession of *tannic* with a little *gallic acid;* and, besides this, it contains *extractive matters*, etc.

Adulteration.—The leaves of the *Vaccinium Vitis Idæa* and of the common *box* are sometimes substituted for Uva Ursi. The former are known by being dotted on the under surface, and minutely toothed at the edges, while the latter are detected by their want of astringency.

Oper. and Uses.—Uva Ursi is astringent and sometimes diuretic. It appears, in some cases, to act like buchu and pareira brava in diminishing excessive secretion of the bladder in chronic catarrh of that organ, and in lessening its irritable condition.

Dose of the powdered leaves, grs. x.—ʒj.

Off. Preps.—*Decoctum Uvæ Ursi.* (Uva Ursi bruised, ʒj., and boiled down in distilled water, Ojss., [f℥xx., U. S.,] and strained.) *Dose,* f℥j.—iij.

Extractum Uvæ Ursi. L. (Prep. as extract of gentian.) *Dose,* grs. v.—xv.

PYROLACEÆ.

Chimaphila Corymbosa. L. (*Umbellata.*) *U.S.*—Umbellated Winter-Green.

Decandria, Monogynia.

[A perennial plant with a woody creeping rhizome, and ascending, somewhat angular, stems, furnished at the upper part with irregular whorls of evergreen, coriaceous, serrate, smooth, cuneate lanceolate leaves. The flowers are white, odorous, in a small corymb. Fruit, a capsule.]

Hab.—Central Europe and North America.

Chimaphila. U. S. (*Folia.*) *L.*

Description.—The leaves are lanceolate and deeply serrated; their *colour*, dark green and glossy; *consistence*, coriaceous; *odour*, peculiar, when bruised; *taste*, bitter and astringent.

Chem. Comp.—The leaves contain *tannin* and a *bitter extractive* matter.

Operation.—It is stated to be *tonic* and *diuretic;* although, like most medicines of its class, it frequently disappoints the practitioner. The tannic acid it contains, also renders it in some degree *astringent;* an action exerted, as in the case of uva ursi, most particularly upon the urinary mucous membrane.

Uses.—Its decoction is employed as a vehicle for the administration of saline and stimulating diuretics in *dropsical affections*, and also in *chronic catarrh of the bladder*, with the view of diminishing its excessive mucous secretion.

Off. Prep.—*Decoctum Chimaphilæ. L. U.S.* (A simple decoction of the leaves, ℥j., in water, Ojss.) *Dose*, f℥j.—ij.

STYRACEÆ.

Styrax Officinale.—The Officinal Storax.

Decandria, Monogynia.

A small tree, having a roughish gray bark and ovate leaves, which are downy on the under surface. The flowers are ar-

ranged, from two to six together, in a short terminal raceme: the corolla is white and campanulate, with five to seven lance-shaped segments. The fruit is coriaceous, downy, and single-seeded.

Hab.—Syria, Arabia, Greece, and the south of Europe.

Styrax. U. S. (*Balsamum.*) *L.*

Description.—It occurs in the *form* of masses, rarely in tears, of a reddish-brown *colour*. *Consistence*, brittle and friable, but feeling clammy when handled. *Odour*, like that of balsam of Peru. *Taste*, warm and aromatic. There is a *liquid storax* known in the trade, having the consistence of birdlime, a gray *colour*, and an *odour* of the solid storax.

Extraction.—The juice exudes from the tree, on incisions being made into the stem: but whether it is *obtained* in this way, or from punctures made by insects, no certain knowledge is possessed.

Chem. Comp.—Like other resinous exudations, storax contains a *volatile oil*, a *resin*, resulting from its oxidation, and *benzoic acid*. The *volatile oil* can be separated into a solid and liquid portion. The *resin* is similar to ordinary resin.

Adulteration.—Storax is commonly mixed with sawdust, though it is doubtful whether this is an intentional imposition.

Oper. and Uses.—As Balsam of Peru.

Off. Preps.—*Styrax Colatus. L.* (The storax is dissolved in rectified spirit, the solution strained, and the spirit distilled off.) This process is rendered needful before the drug can be employed, from the impurity of the commercial storax. *Dose*, grs. x.—℈j.

Pilulæ Styracis Compositæ. L. (Strained storax, ℥iij., opium, ℥j., and saffron, ℥j., beaten together into a mass.) A grain of opium is contained in 5 grs. of this pill. It is used when we desire to administer opium to persons who object to it on grounds of prejudice. Neither the name of the pill, its taste, or odour, reveal the narcotic it contains. *Dose*, grs. v.—x.

Styrax Benzoin.—The Benjamin Tree.

Decandria, Monogynia.

This is a tree of considerable height, having its branches covered with a downy bark, and possessing oblong pointed leaves, downy on the under surface. Its flowers are arranged in compound axillary racemes, the calyx being campanulate, downy, and obscurely 5-toothed, and the corolla of a cineritious colour, and divided into five segments.

Hab.—Sumatra and Borneo.

Benzoinum. U. S. (*Balsamum.*) *L.*

Description.—Benzoin of the finest quality, or *Siam benzoin*, occurs in the *form* of masses composed of agglutinated tears, which cause the fractured surface to have an amygdaloid appearance. Sometimes the tears are separate. *Colour*, pale reddish-brown, the tears of a whitish or amber colour. *Odour*, aromatic and agreeable. *Taste*, balsamic. An inferior variety, known as *Calcutta benzoin*, is of a darker colour, and more uniform in its aspect.

Extraction.—Incisions are made into the bark, and the juice which exudes is allowed to remain for some months upon the tree to concrete, and then is pared off.

Commer. Source.—Mostly Calcutta. Occasionally Siam, Sumatra, etc.

Chem. Comp.—This resinous exudation contains about 18 per cent. of *benzoic acid*, 80 per cent. of resin, and a trace of *volatile oil.* The *resin* possesses most of the properties of ordinary resins, and can be resolved into 3 *isomeric bodies*, distinguished by their different solubility in alcohol, ether, etc. Alcohol and liquor potassæ entirely dissolve it.

Oper. and Uses.—Benzoin is stimulant, acting especially upon the mucous membranes, in a similar but more decided manner than the balsams. The chief employment is, like the balsams of Peru and Tolu, for diminishing excessive secretions from the bronchial membrane in chronic diseases of the air-tubes. The

action of this, and of the balsams, is rendered safer by the simultaneous use of counter-irritants to the chest.

Dose.—Grs. v.—℈j.

Off. Prep.—*Tinctura Benzoini Composita. L. U.S.* (Benzoin, ℥iijss., strained storax, ℥ijss., balsam of Tolu, ʒx., and aloes, ʒv., macerated in rectified spirit, Oij., and strained.) [Benzoin, ℥iij.; storax, ℥ij.; balsam of Tolu, ℥j.; aloes, ℥ss.; alcohol, Oij. U.S.] A stimulant used in chronic pulmonary affections, like the balsams. It acts sometimes as a styptic, when applied to bleeding wounds.

Acidum Benzoicum. L. E. U.S.

Phys. Prop.—It crystallizes in the *form* of white, feathery, hexagonal crystals, having no *odour* when free from volatile oil, and an acrid acid *taste.*

Preparation.—The London Pharmacopœia directs it to be *prepared by sublimation;* and, after removing the oil by *compression* between folds of blotting-paper, submitting it to *re-sublimation.* A superior method is to boil the benzoin in powder with *hydrate of lime*, so as to form a benzoate of lime, which is dissolved in the water, while the resin remains combined with the lime in the form of an insoluble compound. *Hydrochloric* acid being added to the filtered liquid, the benzoic acid is set free, and crystallizes on cooling.

Chem. Comp. and Prop.—*Formula*, HO, $C^{14} H^5 O^3$.—The volatile oil of bitter almonds ($C^{14} H^6 O^2$) is converted into benzoic acid by the addition of 2 atoms of oxygen.—Benzoic acid sublimes by heat. It forms soluble salts with the alkalies (benzoates). The benzoates of the common metals are most of them insoluble. A soluble benzoate gives, with a solution of a persalt of iron neutralized with ammonia, an insoluble sub-benzoate of iron of a buff colour.

Oper. and Uses.—This acid, when taken by man, is converted into hippuric acid, and voided by the urine. The change is a very simple one, for hippuric acid has the composition of benzoic acid plus starch, and urea. Formula expressing the change, 2 eqs. benzoic acid 2 ($C^{14} H^6 O^4$)+1 eq. urea ($C^2 H^4 N^2 O^2$)+1 eq. starch ($C^6 H^5 O^5$)=2 eqs. hippuric acid 2 ($C^{18} H^9 N^1 O^6$)+3 eqs.

water (3·HO). The conversion of benzoic into hippuric acid is effected, *not* at the expense of the uric acid of the urine, which remains unaltered in quantity, but of the urea, and a compound belonging to the amylaceous group, probably starch, dextrine, or sugar. The changes produced in the urine by the administration of benzoic acid are, the presence of a large quantity of hippuric acid, a slight diminution in the quantity of the urea, and an increase of the acidity of the fluid. (See paper by Dr. Garrod, in *Memoirs* of *Chem. Gazette*, part ii., and in *Lancet*, vol. ii. 1844, p. 239.)

From these facts, we see that benzoic acid has no power over the uric acid diathesis and gout, as asserted by Mr. A. Ure; for the uric acid remains unaltered in quantity. Experience also proves its inefficacy in these diseases; but from its power of causing an increase of the acidity of urine, it slightly stimulates the mucous membrane, over which that fluid passes, and has been found useful in affections of the bladder, as catarrh, and in cases where there exists a secretion of a granular mucus mixed with phosphates. Benzoic acid also acts as a stimulant to the skin and pulmonary mucous membranes.

Dose.—Grs. iij.—x.

OLEACEÆ.

Olea Europæa.—The Olive Tree.

Diandria, Monogynia.

A moderately-sized tree, having a grayish bark, and narrow lance-shaped opposite leaves, whitish on the under surface. Its flowers are small and white, and grow on axillary racemes. The fruit is a single-seeded, elliptical drupe.

Hab.—The coasts of the Mediterranean.

Oleum Olivæ. U. S. (*Oleum é drupis expressum.*) *L.*

Description.—It is an oily fluid, of a pale straw *colour*, without *odour*, and having a faintly sweet, soft, agreeable *taste*. The

finest kind is the Provence; and the next in estimation is the Florence oil, imported in flasks as *salad oil.*

Extraction.—The finest oil is furnished by the ripe drupes, by crushing them in a mill as soon as they are gathered, and exposing the pulp to a gentle pressure. An inferior oil is obtained by moistening the marc with boiling water, and re-pressing it. The worst kind, that from Spain, is made from olives which have been allowed to ferment previous to expression.

Chem. Comp.—It consists of about 78 per cent. of *margarine*, and about 22 per cent. of *elaine*. The margarine, united with a portion of the elaine, is deposited by cold (see *Introduction*).

Adulteration.—Poppy and other oils are commonly used to adulterate it. This sophistication is detected, either by the less ready manner in which it deposits its margarine, when exposed to cold, or by its tardy consolidation when mixed with newly-prepared nitrate of mercury.

Oper. and Uses.—Olive oil is demulcent, and, when administered in sufficient doses, laxative. It is fitted for use in *inflammatory conditions of the alimentary canal*, in which oils and fats appear to be generally well borne by the stomach, and sometimes to relieve pain. It is also given by the mouth in some forms of *acrid poisoning*. It is a common addition to emollient and aperient clysters. It is also employed in the preparation of liniments, ointments, etc.

Dose.—f℈j.—f℥j. or ij.

Ornus Europæa.—The European Flowering Ash.

Diandria, Monogynia.

This is a lofty tree, much resembling our common ash in general aspect: the leaves are large, opposite, and pinnated, the leaflets being oblong and irregularly toothed. It has small greenish-white flowers, which are polygamous, and grow in large panicles. The fruit is an indehiscent, winged samara.

Hab.—Calabria and Sicily.

Manna. U. S. (*Succus concretus.*) *L.*

Description.—The finest kind, or flake manna (manna cannulata), is in the *form* of stalactitic masses, about six inches long and an inch broad, hollowed and stained on one side, by which they had adhered to the tree. *Colour,* white, or pale yellow. *Consistence,* light and friable. *Odour,* faint. *Taste,* sweet at first, and subsequently bitter.

How obtained.—Incisions are made into the bark, and the colourless viscid juice which exudes, is made to concrete upon chips and straws fastened near them. Unless this precaution be taken, it acquires impurities, by trickling down the bark and falling to the ground. The best is collected in August, during the height of the season.

Commercial Source.—Palermo and Messina.

Chem. Comp.—It consists chiefly of a crystallizable sugar, called *mannite*, and a *bitter principle*, to which it appears to owe its purgative properties.—*Mannite* crystallizes in slender colourless four-sided prisms, has a slightly sweet taste, and is soluble in water and hot alcohol. It is *not* fermentable.—*Formula,* $C^6H^7O^6$.—Mannite is also procured from cane or grape sugar, along with lactic acid, by a peculiar fermentation, called the viscous. It is converted by nitric acid into oxalic and saccharic acids.

Oper. and Uses. Manna is a mild laxative, suited for children and weak individuals, but, on several accounts, now falling into disuse. It sometimes causes griping during its operation; and excites flatulence. It is seldom exhibited alone, but in combination with senna, or some neutral aperient salt.

Dose.—℥j.—ij.

APOCYNACEÆ.

Strychnos Nux-vomica.—The Poison-nut Tree.

Pentandria, Monogynia.

[A medium-sized tree, with a short, thick, crooked trunk, and irregular branches. The leaves are opposite, oval, shining, en-

tire. The flowers are in small terminal corymbs. The fruit is about the size of an apple, with a hard orange-yellow shell, filled with a soft white pulp, with many seeds immersed in it.]

Hab.—Coromandel, Ceylon, and the islands of the Indian Archipelago.

Nux-vomica. U.S. (*Semina.*) *L.*

Description.—*Form*, circular and flattened, depressed in the centre on one side, convex on the other. *Colour*, grayish, and the surface is covered with a velvety down. *Consistence*, tough and almost horny. *Odour* of the rasped seeds, resembling liquorice. *Taste*, extremely bitter.

Chem. Comp.—These seeds contain two alkaloids, *strychnia* and *brucia*, an *acid* called the *strychnic* or *igasauric*, as well as fatty matters, wax, gum, starch, woody fibre, etc.—For *strychnia and brucia*, see Strychnia below.—*Igasauric acid* is obtained from the igasaurate of magnesia, which is formed in the preparation of strychnia. It occurs in crystalline grains, which have a sharp flavour; it dissolves readily in alcohol and water, and forms soluble salts with the alkalies, and with the salts of copper a rather insoluble salt of a bright green colour.

Oper. and Uses.—As strychnia, by which it has in a great degree been replaced in practice.

Dose.—grs. ij., gradually increased.

Off. Prep.—*Strychnia.*

Strychnia.

Prep.—Strychnia exists in the seeds in the form of an igasaurate; and the process adopted by the London College for its extraction is as follows:—spirit is repeatedly boiled upon the bruised seeds, so as to dissolve out the *igasaurate of strychnia*, and is then evaporated to an extract.—This is dissolved in cold water and strained, and, after being again evaporated to the consistence of a syrup, the igasaurate is decomposed by means of magnesia, which takes the acid, forming an insoluble *igasaurate of magnesia*, leaving the *strychnia* free and precipitated along with the latter salt.—After separation of the compound

precipitate by subsidence and pressure, it is boiled with spirit, which dissolves out the strychnia; and the solution, being filtered and evaporated, has diluted sulphuric acid added, which combines with the alkaloid, and, after some hours, the *sulphate of strychnia* crystallizes out.—The crystals are freed from the liquid by pressure, dissolved in water, and decomposed by addition of ammonia; *strychnia* precipitates, and is afterwards taken up by boiling spirit and set aside to crystallize.

Chem. Comp. and Props.—When pure, strychnia crystallizes in small octahedrons, requiring 6500 parts of cold and 2500 parts of boiling water to dissolve them; little soluble also in absolute alcohol, but soluble in weak spirit.—*Formula*, $C^{44} H^{23} N^2 O^4$.—Its solutions have an alkaline reaction, and an intensely bitter taste. They are precipitated by *tannic acid*. *Pure* strychnia is *not* coloured by nitric acid, but the commercial strychnia is so, from its admixture with brucia. Strychnia forms crystallizable salts with the acids, which are much more soluble in water than the alkaloid itself, and which might with great advantage be used in medicine.

(*Brucia* is found combined with strychnia in the nux-vomica, St. Ignatius-bean, and bark of the strychnos antidysenterica. It is more soluble in water and alcohol than strychnia, by which property it may be separated from the latter. Its solutions are very bitter, but not so intensely so as strychnia. Anhydrous brucia crystallizes with great difficulty, but a hydrate can be readily obtained in oblique 4-sided prisms.—*Formula*, $C^{44}H^{25}N^2O^7$.—It is distinguished from strychnia by giving a red colour with nitric acid; and from morphia, which is also coloured red by nitric acid, by becoming violet on the further addition of protochloride of tin.)

Operation.—We have before referred to this alkaloid, as affording one of the purest examples of a medicine which operates as a special stimulant to the spinal cord. Its administration in moderate medicinal doses is sufficient to manifest this mode of action, being followed by convulsive twitchings of the voluntary muscles, particularly when the influence of the will is withdrawn by sleep or palsy. In the latter case, the paralysed parts are the first and always the most powerfully affected. There is no certain information that it acts at all as a general stimulant. In larger

doses, the above effects occur in a more exalted degree, and reflex phenomena become readily produced under the influence of excitory impressions, which naturally would be very insufficient for the purpose, issuing at length in paroxysms of general tetanic rigidity. When strychnia or nux-vomica are about to prove fatal, these increase in intensity, and, affecting the respiratory muscles, death occurs by asphyxia, brought about by their prolonged spasmodic contraction. During the whole progress of poisoning, the intellect remains entire. In minute doses, it is reported tonic, but in our hands has proved very far inferior, in this respeet, to quina, the most obvious effect which it has manifested being improvement of the appetite.

Uses.—The principal use to which strychnia is applied, is the restoration of power to *paralysed* parts; but since paraplegia and hemiplegia take origin for the most part in some hyperæmic or hæmorrhagic condition of the nervous centres, such a remedy as this is plainly inapplicable to their recent forms. It is when all inflammatory action or congestion has been removed, yet without return of power in the paralysed limbs, that strychnia is indicated for employment. Very chronic cases are thus sometimes benefitted by it, and *paraplegia* more frequently than *hemiplegia*. *Local palsies* are frequently cured by its endermic use. The dropped face from palsy of one portio dura, often a consequence of exposure to a draught of air, is very commonly rectified in this way, all vascular excitement having been previously removed by general or topical depletion. It has been recommended also in *paralysis of sensation* and *amaurosis;* but its employment in these cases has not been followed by any very favourable results. It is sometimes serviceable as a tonic in *dyspepsia* and *pyrosis.*

Dose.—Gr. $\frac{1}{10}$th or $\frac{1}{8}$th given in the form of a pill, or $\frac{1}{16}$th administered in solution, a form in which it appears to present considerably greater activity. These doses may be repeated, and very gradually increased, till twitchings of the palsied parts are produced; from which time recovery often dates its commencement. As a tonic the dose should commence wtth the $\frac{1}{30}$th or $\frac{1}{25}$th of a grain.

[Apocynum Cannabinum.—Indian Hemp.

A perennial herbaceous plant, with an upright stem, and oblong leaves, tomentose beneath, on short petioles. The flowers are small, of a greenish-white externally and pinkish internally, and collected in paniculate cymes. The pods are long, and slender.

Hab.—Throughout the United States.

Apocynum Cannabinum. U.S. (*Radix.*)

Description.—*Form*, in fragments of different lengths, about as thick as a quill, wrinkled. *Colour*, brown externally, white within. *Odour*, unpleasant. *Taste*, bitter, nauseous, and somewhat acrid.

Chem. Comp.—From the analyses of Drs. Knapp and Griscom, it is shown that this root contains tannin, gallic acid, gum, resin, wax, colouring matter, and a peculiar bitter principle, for which both have proposed the name of Apocynin.

Oper. and Uses.—Indian hemp acts powerfully on the system, producing emetic, cathartic, diuretic, and sudorific effects. Its first operation in a full dose is to cause much nausea, a diminution in the frequency of the pulse, succeeded by vomiting, and followed by copious watery alvine evacuations. It has been found very useful in dropsy, both from its hydragogue powers, and from acting powerfully on the urinary organs, causing a large discharge of urine. It has also been given in some diseases of the respiratory organs with advantage.

Dose.—As an emetic, in powder, grs. xv.—xxx. As a hydragogue or diuretic, in decoction made with ℥j. of the root to Oj., *Dose*, f℥ij.—iij.

The *A. androsæmifolium*, or dog bane, is also recognised in the secondary list, U.S.P. It much resembles the Indian hemp in its action on the system, but is less powerful.]

SPIGELIACEÆ.

Spigelia Marilandica.—The Perennial Worm-grass.

Pentandria, Monogynia.

This is a herbaceous plant with a perenial root; it has ovate, sessile, and opposite leaves. Its flowers are large, and arranged in a terminal spike or raceme; the corolla is regular and funnel-shaped, much longer than the calyx, of a rich carmine colour externally, paler at the base, and orange-yellow within.

Hab.—Southern parts of North America.

Spigelia. U. S. (*Radix.*) *L.*

Description.—The officinal part of the plant is the root, which is met with in the *form* of a rhizome, of a dark brown *colour*, giving rise to many slender branched fibres. *Taste*, bitter.

Oper. and Uses.—It is only known or used as an anthelmintic, but is rarely, if ever, administered in this country (England). [It is more commonly employed in the United States than any other anthelmintic, especially in the form of what is called *worm tea*, this consists of spigelia, senna, manna, and savine, in various proportions, as they may be required.]

Dose for an adult, ʒj.—iij. For children, grs. x.—℈j.

[*Infusum Spigeliæ. U.S.* Spigelia, ℥ß.; boiling water, f℥xvj.; macerate and strain. *Dose* for children, 2 or 3 years old, fʒss.—j. For adult, f℥iv.—viij.]

GENTIANACEÆ.

Gentiana Lutea.—The Yellow Gentian.

Pentandria, Digynia.

A long, erect, herbaceous plant, having a round, hollow stem. It has broad, pale-green, opposite leaves, ovate, and with five to seven ribs, the upper leaves being amplexicaul, and the lower on short, sheathing petioles. Its flowers are whorled, large, and

yellow, having a membranaceous, unilateral calyx, and a rotate corolla, with from five to eight acute segments.

Hab.—The Alps of Austria and Switzerland, the Appenines, and the Pyrenees.

Gentiana. U. S. (*Radix.*) *L.*

Description.—*Form*, cylindrical, rough, and twisted pieces, varying in length and breadth, wrinkled annularly and longitudinally. The larger pieces are split lengthwise. *Colour* of the epidermis, brownish-yellow. *Consistence*, tough, spongy, and easily sliced. *Taste*, very bitter.

Chem. Comp.—Gentian contains a crystallizable substance which has been called *gentianine*, and a *volatile matter* having the odour of the root, together with the ordinary constituents of the roots of plants.—*Gentianine* occurs in yellow crystals, inodorous, but having an intensely bitter flavour, slightly soluble in water, but very soluble in alcohol and ether. It is a *neutral* substance. It has been stated not to be a simple principle, but composed of two, a tasteless *acid* called *gentisin* or *gentisic acid*, and a bitter principle called *gentianite*.

Chem. Rel.—*Acids* diminish both the colour and bitterness of the infusion, while *alkalies* increase both. Salts of iron and nitrate of silver do not precipitate it.

Oper. and Uses.—A very useful tonic, fitted for similar cases to calumba.

Dose.—Of the powders, grs. x.—ʒß.

Off. Preps.—*Infusum Gentianæ Compositum. L. U. S.* (Sliced gentian, ʒij.; dried orange-peel, ʒij.; and fresh lemon-peel, ʒiv.; macerated in boiling distilled water, Oj., and strained.) *Dose*, f℥j.—ij. [U. S. orders gentian, ʒß; orange-peel and coriander, āā ʒj.; alcohol, f℥iv.; water, f℥xii.]

Tinctura Gentianæ Composita. L. U. S. (Sliced gentian, ℥ijß, [℥ij. U. S.], dried orange-peel, ʒx. [℥j. U. S.], and bruised cardamoms, ʒv. [ʒß, U. S.], macerated in proof spirit, Oij., and strained.) *Dose*, fʒß—ij.

Extractum Gentianæ. L. U. S. (Sliced gentian, ℔ijß, is macerated in boiling distilled water, *cong.* ij., and the infusion boiled down to a half, strained and evaporated to a proper consistence.)

Dose, grs. v.—ʒß. It is a good vehicle for administering sulphate of iron in a pill.

Mistura Gentianæ Composita. L. (Twelve fluid ounces of compound infusion of gentian, mixed with six fluid ounces of compound infusion of senna, and two fluid ounces of compound tincture of cardamoms.) A good tonic purgative for dyspeptic cases.

Dose.—f℥j.—ij.

Erythrœa Centaurium.—The Common Centaury.

Pentandria, Monogynia.

This is an annual herb, with a straight woody stalk, rising to the height of about eight inches. It has opposite, oblong, ribbed, and sessile leaves. Its flowers grow upon a terminal corymb, and its corolla is salver-shaped and pink, and only expands in the sunshine.

Hab.—In dry situations in England, &c.

Centaurium. L.

The whole herb is officinal, and has a bitter taste.

Uses.—It is a valuable bitter, equal in every respect to gentian. It is best administered in the form of infusion.

Menyanthes Trifoliata.—The Common Buckbean.

Pentandria, Monogynia.

A herb with a perennial root, growing commonly in the bogs of this country, with trifoliate leaves on long stalks, and sheathing stipules. The flowers grow in racemes; and the corolla has a spreading five-lobed limb, beautifully fringed on the inside.

Hab.—Europe and the United States.

Menyanthes. L.

The whole herb is officinal, and has a bitter taste.

Chem. Comp.—It owes its activity to a *bitter extractive*, which may probably contain substances similar to those found in gentian.

Oper. and Uses.—A useful indigenous tonic, which, like centaury, may be advantageously used in place of gentian.

Dose.—℈j.—ʒß; either administered in powder, or in the form of infusion.

Agathotes Chirayta.—The Chirayta.

Pentandria, Digynia.

An herbaceous plant, having a round, smooth, and jointed stem, with opposite, amplexicaul, lanceolate, entire leaves. It bears numerous yellow flowers, which have a rotate corolla, with a four-parted limb having nectariferous hollows protected by a fringed scale.

Hab.—The northern parts of India.

Chiretta. E.

The whole plant is rendered officinal by the Edinburgh College. It is strongly bitter; but the root possesses this property in a greater degree than any other part of the herb.

Chem. Comp.—Similar to the gentian.

Oper. and Uses.—As the gentian. It is mostly administered in the form of infusion, ʒiv. of the herb being macerated in Oj. of boiling water.

Dose of the herb, ℈j.; of the infusion, f℥j.—ij.

[Sabbatia Angularis.—Centaury.

Pentandria, Monogynia.

An annual and biennial herbaceous plant, with an erect stem, simple below, divided above, from a foot to eighteen inches in height. The leaves are sessile, opposite, ovate, acute. The flowers are numerous, of a rose-red colour above, paler beneath, with a yellow star in the centre of the corolla. The fruit is a one-celled, two-valved capsule.

Hab.—Old fields and low grounds in most parts of the United States.

Sabbatia. U. S.

The whole herb is officinal. Every part of it contains a very pure and intense bitter.

Oper. and Uses.—It is a pure bitter, agreeable to the stomach, and from possessing but little stimulating powers may be given when other articles of its class are contra-indicated. It is more active than the European centaury, and much to be preferred to it. It yields its virtues both to water and alcohol, and may also be advantageously used as an extract.

Frasera Walteri.—American Colomba.

Tetrandria, Monogynia.

A very tall, herbaceous perennial,—the stem, which is erect, attaining a height of eight or ten feet. The leaves are opposite and verticillate, oblong, lanceolate, the lower ones a foot long and three inches broad. The flowers are in long peduncles, verticillate, of a greenish-yellow colour, speckled with purple. The fruit is a capsule, which is much compressed and oval.

Hab.—West, north, and south of the Alleghany ridge, in open glades and meadows.

Frasera. U. S. (*Radix.*)

Form, spindle-shaped, hard, rugose, or in pieces resembling those of colomba. *Colour*, yellow externally, and yellowish within. *Taste*, bitter, with no aroma. *Odour*, feeble, amylaceous.

Chem. Comp.—An examination made by Mr. Douglas shows that this root contains gum, tannin, gallic acid, resin, fatty matter, bitter extractive, a yellow colouring substance, &c.

Oper. and Uses.—The fresh root is said to be both emetic and purgative; in a dried state it very closely resembles gentian in its effects on the system. It was at one time considered as an equivalent of the colomba, but further trials with it have shown that its powers are more in accordance with those of the other bitter plants of the order to which it belongs. It is but seldom used to the east of the mountains, but is much esteemed in the Western States. It is a pure and efficacious bitter, and may be used where remedies of this class are indicated. It is given in powder, decoction, or infusion.]

CONVOLVULACEÆ.

Ipomæa Purga.—The Jalap Plant.

Pentandria, Monogynia.

This is a twining herb, having ovate, more or less heart-shaped, leaves, and flowers of a purplish-red colour, much resembling the common convolvulus in shape.

Hab.—Mexico, near Jalapa.

Jalapa. U.S. (*Radix.*) L.

Description.—*Form*, in more or less round or oval pieces; often sliced, to facilitate the drying, when very large. *Consistence*, heavy and compact, with concentric resinous layers. *Colour*, externally, brown, and the cuticle wrinkled; internally, a deep yellowish-gray. *Fracture*, resinous. *Odour*, faint and disagreeable. *Taste*, nauseous.—Light friable jalap is of inferior quality. The worm-eaten jalap has lost much of its amylaceous matter, while the resin is left.

Chem. Comp.—Jalap contains about 10 per cent. of *resin*, and 25 per cent. of an *extractive matter*, the rest being composed of woody fibre, starch, etc.—The *resin* consists of two distinct substances, which have been called *jalapine* and *jalapic acid*, both soluble in water, from which the latter is precipitated by acetate of lead. It forms about $\frac{1}{10}$th of the resin, and is more soluble in alkalies than jalapine. Jalap resin is distinguished from common resin by its insolubility in volatile oil.

Oper. and Uses.—Jalap is a valuable cathartic, which, although acting powerfully upon the peristaltic movements of the intestinal canal, yet, in consequence of the large secretion of fluid which accompanies its operation, has been classed among the hydragogues. Its purgative action is augmented by the addition of calomel, and its hydragogue by bi-tartrate of potash, while a few grains of ginger obviate the tendency to gripe which the drug sometimes manifests. Camphor is also said to lessen the griping, while it augments its purgative operation. Few purgatives are to be more relied upon than this, in cases of neglected

constipation, or where it becomes desirable to evacuate the bowels in febrile or inflammatory diseases. It is especially useful in those febrile affections of children, which frequently arise in a constipated condition of the bowels; as well as being, when combined with a little calomel, one of the most effectual means of expelling ascarides from their rectum. *Dropsies* are sometimes relieved by its hydragogue action, especially when obtained through the pulvis jalapæ comp. It is, moreover, a fit purgative to select, for the sake of its derivative operation, in diseases of the brain.

Dose.—Grs. x.—ʒß.

Off. Preps.—*Pulvis Jalapæ Compositus. L. E. U. S.* (One part of jalap, rubbed in powder, with two parts of bi-tartrate of potash and a little ginger.) [The E. and U. S. omit the ginger.] *Dose*, ℈j.—ʒj.

Tinctura Jalapæ. L. E. U. S. (Powdered jalap, ℥x. [℥viij. U. S.], macerated in proof spirit, Oij., and strained.) This is an excellent addition to the ordinary black draught, when it is desired to increase its activity. *Dose*, fʒj.—f℥ß.

Extractum Jalapæ. L. U. S. (Powdered jalap, ℔ijss. [℔j. U. S.] is macerated in rectified proof spirit, *cong.* j. [Oiv. U. S.], so as to dissolve the resin, and the residue boiled with water, so that the extractive may be taken up. Both are then evaporated, and the extracts mixed and evaporated to a proper consistence. *Dose*, grs. x.—℈j. Part is directed to be preserved *soft*, and part *hard*, for powdering.

Convolvulus Scammonia.—The Scammony.

Pentandria, Monogynia.

This is a twining plant, having a slender stem and sagittate leaves; the corolla resembles in shape that of the common convolvulus, and is of a pale yellow colour, with purple stripes.

Hab.—The Levant.

Scammonium. U. S. (*Gummi resina.*) L.

Description of the finest or virgin Scammony.—*Form*, irregular masses. *Colour*, ash-gray, externally. *Consistence*, friable,

easily reduced to fragments by the pressure of the nail. *Fracture*, resinous, of a pale grayish-green colour passing into greenish-black. *Odour*, strong and peculiar. *Taste*, bitter and slightly acrid.

How obtained.—The earth is cleared away from the root, which is then cut slantingly across at a short distance from the top. The milky juice which exudes is collected in a shell and allowed to harden.

Chem. Comp.—Good scammony consists of 60 per cent. of *resin*, the remainder being made up of *gum*, *extractive matters*, *starch*, etc. The *resin* is distinguished from that of jalap, by not only being soluble in alcohol, but also in volatile oils.

Chem. Rel.—Rubbed with *water*, scammony forms a milky emulsion. *Liquor potassæ* gives a yellow precipitate with the solution.

Adulterations.—No drug is more adulterated than this. *Chalk* and *flour* are mixed with it when it is in a soft state, while ashes, sand, dirt, and masses of lead, are occasionally introduced to augment its weight. *Starch* is detected by adding iodine to the filtered cold decoction, while *chalk* is recognised by scammony effervescing with hydrochloric acid.

Oper. and Uses.—It is very similar in its action to jalap, but more powerfully drastic, and also more liable to gripe during its operation. It is used, too, in similar cases, and is frequently administered as a vermifuge, especially to children.

Dose.—Grs. v.—x., combined like jalap with calomel or sulphate of potash, in order to diminish its griping operation. The dose for children is grs. j.—v.

Off. Preps.—*Pulvis Scammonii Compositus. L.* (Equal parts of scammony and hard extract of jalap, both in powder, mixed together with some ginger.) *Dose*, grs. x.—℈j.

Confectio Scammonii. L. (Powdered scammony, ℥jss., bruised cloves and powdered ginger, each ʒvj., are directed to be mixed, when required for use, with syrup of roses and some oil of caraway.) *Dose*, ℈j.—ʒj.

SOLANACEÆ.

Hyoscyamus Niger.—The Common Henbane.

Pentandria, Monogynia.

An annual and biennial plant, with an erect woody stalk, and large, sessile, sharply-lobed leaves, woolly and viscid. The flowers rise from the bosom of the upper leaves, and are of a light yellow colour, beautifully pencilled with purple veins. The whole plant emits an odour resembling that of rotten cheese.

Hab.—Many parts of Europe.

Hyoscyami Folia. L. U. S.

The leaves are officinal, both dried and fresh. They have a mucilaginous, slightly acrid taste.

Chem. Comp.—Like all the medicinal plants belonging to the order Solanaceæ, except capsicum, henbane owes its activity to *an alkaloid* which exists in the plant in combination with *malic acid*. *Hyoscyamia*, the alkaloid contained in the henbane, when pure, can be obtained in acicular crystals, inodorous, and with a sharp, disagreeable taste, resembling tobacco. It is soluble in alcohol, but insoluble in water, and forms crystallizable salts with acids. It evolves ammonia when heated, and consequently must contain *nitrogen;* but no ultimate analysis has been made.

Operation.—Henbane is narcotic and sedative, its operation, in the ordinary medicinal doses, being rather characterized by a calmative influence exerted over the cerebral functions, than by the overwhelming disposition to sleep which follows the exhibition of an opiate; still, however, it frequently does induce sleep. Its full effect is accompanied by dilatation of the pupil, and it has less tendency than opium to diminish secretion, sometimes appearing to give the bowels a disposition to relaxation, rather than inclining them to become costive under its use. It is also believed to be more apt to occasion delirium. Its poisonous action is early accompanied by delirium, a dilated pupil and loss of vision, to which coma and sometimes convulsions succeed.

Uses.—It is substituted sometimes for opiates, as a hypnotic, when the operation of the latter is followed by disagreeable symptoms; but, for the most part, it is prescribed with a view to its anodyne and sedative effects. *Spasmodic coughs or dyspnœa*, and that increased sensibility of the bronchial membrane to the impression of cold air, which, in some individuals, accompanies catarrhal affections, offer conditions favourable to its employment. It has received the powerful recommendation of Dr. Marshall Hall, for the purpose of allaying the delirium and irritable condition of the nervous system, which accompanies *reaction* from the depressing influence of loss of blood. Its anodyne action may be availed of in *neuralgia* and other painful diseases, either by using it topically or as an internal remedy. Its extract may also be employed, like belladonna, *to dilate the pupil*, by smearing it around the orbit, or by application to the conjunctiva itself.

Dose.—Grs. iij.—x. of the powdered leaves.

Off. Preps.—*Tinctura Hyoscyami. L. E. U. S.*—(Dried henbane leaves, ℥v. [℥iv. U. S.] macerated in proof spirit, Oij., and strained.) *Dose*, ♏xx.—fℨij.

Extractum Hyoscyami. L. E. U. S.—(Prepared as extract of aconite.) *Dose*, grs. v.—xv. It is a very variable preparation as met with in the shops. It ought not to be of the blackish colour which it is frequently seen to possess.

Hyoscyami Semina. L. U. S.

Description.—The *henbane* seeds are small, compressed, and reniform, and have an oleaginous and bitter *taste*.

Chem. Comp.—The seeds contain the same active principle with the leaves.

Oper. and Uses.—The same as the leaves.

Atropa Belladonna.—The Deadly Nightshade.

Pentandria, Monogynia.

This is a fœtid herb, with a perennial root, having a dark aspect and purple-coloured stem. Its leaves are ovate and entire, being mostly two together of an unequal size. Its flowers are axillary to the leaves, solitary, drooping, and campanulate,

and the limb of the corolla is of a dark purple colour. It bears a shining black berry about the size of a cherry, and of a sweetish taste.

Hab.—Many parts of Europe.

Belladonna. U. S. (*Folia.*) *L.*

Description.—The leaves are officinal, both fresh and dried. They have a bitterish, acidulous *taste.*

Chem. Comp.—The leaves contain an alkaloid called *atropina,* combined, as in the case of henbane, with malic acid; and besides this, other bodies little known have been described, namely, *pseudotoxine, belladonnine* and *atropic acid.*—*Atropina* occurs, when pure, in small white prisms, soluble in alcohol and water; and the solutions easily become decomposed. It is precipitated by tannic acid. Atropina is a most energetic poison; $\frac{1}{1000}$th of a grain is said to enlarge the pupil.

Operation.—Belladonna is ranked among the narcotics, more on the ground of its anodyne and antispasmodic powers, than from any particular disposition to sleep which its medicinal operation occasions. In these respects, it possesses a very high therapeutical value, since it neither diminishes the secretions nor constipates the bowels. Its full effect, like henbane and stramonium, is accompanied by dilatation of the pupil, and is further characterized by a sense of dryness in the throat, with some difficulty of swallowing, dimness of vision, and vertigo. When it is about to prove poisonous, these symptoms become exaggerated, accompanied by nausea and vomiting, and followed by delirium and coma. Like stramonium, Dr. Williams believes the antispasmodic operation of belladonna to be specially manifested upon the contractile fibres of the bronchi.

Uses.—Its value as an antispasmodic is most observable in diminishing the paroxysmal dyspnœa of *asthma,* and in relieving the peculiar *convulsive cough* which frequently occurs in an irritable state of the nervous system. Hooping-cough is thus benefited by its use, a disease in which a rapid succession of expirations are uninterruptedly repeated, till the patient stops from sheer exhaustion, and then draws a long sonorous breath through the partially relaxed glottis and air-tubes, only prior to the com-

mencement of another series. From its not diminishing the secretions poured into the intestinal canal, it is perhaps preferable to opium, for allaying the spasm and pain of *colic*, especially painters' colic. It is employed as an anodyne in neuralgia and malignant tumours, being either administered internally, or externally applied, in the form of extract or poultice. Its topical application to the præcordia, either as a plaster or endermically, has been recommended, to relieve the severe suffering of *angina pectoris*, as well as for the relief of palpitation, whether due to mere nervous excitement or dependent on organic disease of the heart. In no case where we have employed it, however, has it been productive of the least beneficial result. A very important use of belladonna is for the purpose of *dilating the pupil*, so as to prevent adhesion of the iris to the capsule of the lens, when the internal parts of the eye are suffering from acute inflammation. It is of service also in *incipient cataract*, by dilating the pupil beyond the opaque spot in the centre, by which it almost constantly begins, and thus restoring a temporary vision to the patient. The surgeon also puts the same plan into effect, when about to perform certain operations upon the internal parts of the eye. In these cases, the moistened extract may either be smeared round the orbit, or a filtered solution of it may be dropped into the eye.

Dose of the powder, gr. j., gradually increased.

Off. Preps.—*Extractum Belladonnæ. L.* (Prepared as extract of aconite.) [*Extractum Belladonnæ Alcoholicum. U. S.* Dried leaves of belladonna in coarse powder, ℔j., diluted alcohol, Oiv.; moisten powder with Oss. of fluid, and allow to rest for twenty-four hours. Transfer to percolator, and displace. Evaporate to proper consistence.] *Dose*, gr. j., gradually increased.

Emplastrum Belladonnæ. L. U. S. (Extract of belladonna added to twice its weight of emplast. resinæ, melted.)

Tinctura Belladonnæ. U. S. Belladonna leaves, dried, ℥iv., diluted alcohol, Oij.; macerate and strain. *Dose*, ♏xx.—xl.

Datura Stramonium.—The Thorn-apple.

Pentandria, Monogynia.

This is an indigenous herb, having a smooth, leafy, dichotomous stem. Its leaves, which are of a dark green colour, are large, broad towards the base, and pointed at the extremity, acutely sinuated and toothed. It has large, long and white solitary flowers, placed at the junction of the branches; the calyx is pentangular, and the corolla funnel-shaped and plicated. The fruit is a large oval capsule, beset with spines.

Stramonii Semina. L. U. S.

Description.—The seeds are small, flat, and reniform, of a dark brown *colour*, and have a feebly bitter and acrid *taste*.

Chem. Comp.—The seeds and leaves contain a malate of an alkaloid called *daturia*. *Daturia* forms brilliant prisms, little soluble in cold water, but more so in alcohol and ether. Its composition has not been determined; but it contains *nitrogen*. It has been asserted that another alkaloid (*stramonia*) exists in the datura stramonium; but its very existence is doubtful.

Operation.—The effects produced by the medicinal employment of stramonium, resemble those of belladonna more closely than of any other narcotic. Like it, stramonium is a powerful remedy for relaxing spasm, especially of the muscular fibres of the respiratory tubes and intestines. Its anodyne is more obvious also than its hypnotic action. Its full operation is accompanied by *dilatation* of the pupil, and it has no tendency to suppress secretion or confine the bowels. The earliest indications of its *poisonous effects* are dryness of the throat, giddiness, and delirium, which pass on to coma, with full dilatation of the pupil.

Uses.—Its uses, too, are very similar to those of belladonna. The principal value of stramonium, so far as we have employed it, has manifested itself in *spasmodic asthma;* repeated small doses of the extract often most effectually putting a stop to the recurrence of the dyspnœa, after it had resisted other antispasmodics. Paroxysmal or *convulsive coughs* appear, in a similar manner, to

be benefited by its employment. It has been administered, also, in other diseases *as an anodyne*, such as neuralgia, rheumatism, and enteralgia ; and, it is stated, with success.

Dose of the powdered seeds, gr. ß, gradually increased.

Off. Prep.—*Extractum Stramonii. L.*—(A decoction of the bruised seeds, boiled down to a proper consistence.) *Dose*, gr. $\frac{1}{4}$, gradually increased.

[*Tinctura Stramonii. U. S.*—Stramonium seeds, bruised, ℥iv., diluted alcohol, f℥xxxij., macerate and filter. *Dose*, ♏x.—xx.]

Stramonia Folia. L. U. S.

Description.—The leaves, when dry, lose their narcotic odour, but retain the bitter nauseous taste which they have when fresh.

Chem. Comp.—The leaves contain the same active principles with the seeds.

Oper. and Uses.—As the seeds. The leaves are employed by some practitioners in spasmodic asthma, either administered internally in powder, or smoked, previous to the accession of the fit of dyspnœa. What little experience we have had of the latter method of using them, is not very much in their favour.

Dose.—Gr. j. of the powdered leaves, gradually increased.

[*Extractum Stramonii Foliorum. U. S.*—Stramonium leaves, ℔j. Bruise and express the juice, evaporate to proper consistence. *Dose*, grs. j.—v.

Unguentum Stramonii. U. S.—Stramonium leaves, ℔j., lard, ℔iij., yellow wax, ℔ss. Boil the leaves in the lard, strain, add wax, and stir.]

Nicotiana Tabacum.—Virginian Tobacco.

Pentandria, Monogynia.

An annual herb, viscid to the touch, having a round, erect stem, branching towards the top. Its leaves are sessile, of a pale green colour, oblong, and pointed. The flowers terminate the stem and branches in loose panicles ; the corolla is rose-coloured and fun-

nel-shaped, with a long hairy tube, rather inflated towards the limb: the calyx is shorter than the corolla, and hairy.

Hab.—North and South America. It is cultivated in most parts of the world.

Tabacum. U.S. (*Folia exsiccata*). *L.*

Description.—Dried tobacco leaves are imported packed in bundles. They are of a dark brown *colour*, have a peculiar heavy *odour*, and bitter acrid *taste*.

Chem. Comp.—It contains an alkaloid, called *nicotina*, united with malic acid; and also a *species of camphor*, having the odour of tobacco.—*Nicotina* is obtained by the method described for volatile liquid alkalies (see *Introduction*). When pure, it is a colourless oily fluid, which mixes with water, is volatile, and very soluble in alcohol, ether, and oils. Exposure to the air soon causes its decomposition.—*Formula*, $C^{10}\,H^{8}\,N$.—It forms crystallizable salts with some of the acids, and a crystallizable double salt with chloride of platinum, having the formula $C^{10}\,H^{8}\,N,\ H\,Cl + Pt\,Cl^{2}$. The leaves contain ·08 per cent. of nicotina.

Operation.—Tobacco has already been alluded to as a powerful sedative; but its topical action is stimulant, as is manifested in the effects which snuff gives rise to, when applied to the nasal membrane, and the increase of the mucous and salivary secretions, when the drug is chewed. Taken internally, however, its operation is closely allied to that of digitalis, proving sedative to the heart and the system at large. In small doses, it proves diuretic; but in larger, induces faintness or syncope, pallidity of the features, a feeble pulse, muscular relaxation, and nausea or vomiting, with purging: these results ensue also when the infusion or smoke are injected into the rectum. The smoking of the drug by those unhabituated to its use, sometimes gives rise to similar disagreeable symptoms; but when the custom has been established, it exercises a soothing and tranquillizing influence over the sensorial faculties, occasionally appearing to favour sleep. In poisonous quantities, the depression of the system becomes alarming, all the effects above enumerated appearing in an aggravated degree; and syncope, cold sweats, with con-

vulsions and insensibility, precede the fatal termination. Its sedative influence, when smoked, is exerted also upon the bronchial mucous membrane, diminishing its irritability, and sensibility to the impression of cold air.

Uses.—The sedative and relaxing influence of tobacco renders it, in judicious hands, a powerful but useful medicine. It is accordingly employed in enemata, to assist the reduction of a *strangulated hernia;* but when so energetic a remedy fails to induce a sufficient relaxation to admit of the return of the bowel, the operation should not be delayed. Tobacco clysters often succeed in procuring evacuation from the bowels in *colic* and *ileus*, when every other purgative has been tried in vain. Smoking sometimes proves of advantage to *asthmatic patients*, and those who labour under *convulsive coughs;* and it also, now and then, appears to relieve a paroxysm of toothache. It has been recommended as a diuretic in *dropsy*, but its use has been entirely abandoned; Cullen, and others who employed it, having regarded it as uncertain in operation, as well as inconvenient from the nausea and vomiting which its administration gives rise to. Nor is it now employed at all for its emetic powers. Snuff is included in the class of errhines. Infusion of tobacco is occasionally employed as a wash for the destruction of pediculi. It is only used in the form of infusion.

Off. Prep.—*Enema Tabaci. L. U.S.*—(A drachm of tobacco infused in a pint of boiling water). We are disposed to regard this as too strong to commence with, grs. xv.—xx. being sufficient.

[*Unguentum Tabaci. U.S.*—(Fresh tobacco, ℥j.; lard, ℔j. Boil the tobacco in the lard till friable; strain.) Employed in skin diseases; requires caution.

Vinum Tabaci. U.S.—(Tobacco, ℥j.; wine, Oj. Digest and filter. *Dose*, ♏x.—l.)]

Solanum Dulcamara.—The Woody-Nightshade.

Pentandria, Monogynia.

An indigenous herb, with a slender climbing stalk, rising, by the support of the shrubs among which it grows, to the height of four or five feet: its leaves are of a deep green colour; the

lower ones ovate, the upper more or less perfectly halbert-shaped. The flowers are arranged in drooping clusters, either terminal or opposite to the leaves; the corolla is rotate, and of a purple colour; and the oblong anthers, placed in close apposition in the centre of the flower, are a bright yellow, and open by pores at the apex.

Dulcamara. U.S. (*Caulis.*) *L.*

The stems, when dried, are deficient in *odour*, but have a bitter *taste*, becoming afterwards sweet and slightly acrid.

Chem. Comp.—The stalk contains an alkaloid, called *solania. Solania*, discovered also in the solanum nigrum, as well as in the young shoots and fruit of the solanum tuberosum, occurs, when pure, in the form of very fine needles, not unlike sulphate of quina; having a bitter taste, reacting like an alkali, and forming crystallizable salts with acids. *Formula*, $C^{84} H^{68} N O^{28}$.

Oper. and Uses.—It is not ascertained what extent of operation dulcamara possesses, nor yet what is the precise nature of its action. It is generally imagined to be narcotic, but is not prescribed with a view to this effect. In *chronic cutaneous*, and *cachectic affections*, it is sometimes employed empirically; and although of questionable utility itself, the decoction may be used as a vehicle for more active remedies, such as arsenic or bi-chloride of mercury.

Off. Prep.—*Decoctum Dulcamaræ. L. U. S.*—(Dulcamara, ℥x., [℥j. U. S.] cut up and boiled down in distilled water, Ojss., and strained.) *Dose*, f℥j.—ij.

Capsicum Annuum.—The Common Capsicum.

Pentandria, Monogynia.

An annual herb, with a crooked branched stem, rising to the height of two or three feet; its leaves are ovate and pointed, placed upon long footstalks. It has white flowers, solitary and axillary, with a rotate corolla and an angular persistent calyx.

The fruit is dry and scarlet-coloured, varying very much in form, being oblong, or more or less round.

Hab.—The East and West Indies. Cultivated in England, and United States.

Capsicum. U. S. (*Baccæ.*) *L.*

Description.—The capsicum, ordinarily met with, is oblong in *form*, and more or less pointed and shrivelled, of an orange-red or yellow *colour*, and a hot pungent *taste*.

Chem. Comp.—The medicinal properties of capsicum depend on its possessing an *acrid oil*, which has been termed *capsicin*. In ordinary temperatures this is semi-liquid, but becomes quite fluid on the application of heat. It is volatile, and its vapour excites violent cough and sneezing. It is very soluble in alcohol and alkalies, but only slightly so in water and acids.

Operation.—It is a powerful topical stimulant, whether applied to the skin, or taken into the stomach; but, although exercising some influence over the circulation at large, it is very far inferior to other excitants in its general operation. It occasions a burning sensation in the mouth and throat, together with a feeling of warmth in the stomach, and, when taken with the food, promotes the digestive process.

Uses.—Capsicum is a useful addition to the food of some *dyspeptic* individuals, who have accustomed themselves to powerful stimulants, in the form of food or drink, but its principal medicinal employment is connected with its local action. It is accordingly employed in gargles, in the earliest stage of inflammatory *sore-throat*, as well as for *relaxed* conditions of the *uvula*. In the latter case, the tincture may be applied, by means of a camel's hair brush, with equal advantage.

Dose.—Grs. v.—x.

Off. Prep.—*Tinctura Capsici. L. U.S.* (Bruised capsicum, ℥x., [℥j. U. S.] macerated in proof spirit, Oij., and strained). In forming a gargle, ♏x. may be added to each f℥j. of infusion of roses. *Doses,* ♏x. fʒj.

SCROPHULARIACEÆ.

Digitalis Purpurea.—The Purple Foxglove.

Didynamia, Angiospermia.

A biennial herb, with an erect downy stem, terminated by a long one-sided raceme of campanulate and pendulous flowers. The limb of the corolla is obliquely four-lobed; it is of a purple colour, and beautifully spotted and hairy within. The leaves are rugged and downy, of a dull green colour, oval and obtusely serrated, standing upon short winged footstalks; the veins form a network upon their under surface.

Hab.—Europe, cultivated in the United States.

Digitalis (U.S.) Folia. L.

Description.—Both the fresh and dried leaves are officinal; they have scarcely any *odour*, and a peculiar, bitter, nauseous *taste*.

Collection, etc.—The leaves should not be taken from plants in their first year. They should be gathered when the plant is just about to flower, the footstalks removed, and the remainder dried by a gentle heat. They should be preserved in well-closed bottles, darkened as for conium.

Chem. Comp.—Foxglove appears to owe its activity to a principle called *digitalia*, which has been found in it, besides which the leaves contain *tannin*, *resin*, *starch*, *gum*, etc. *Digitalia* is a crystallizable substance, of an acrid taste, and possessing the reaction of an alkaloid. Other principles, called *picrine* and *scaptine*, have been described, but nothing is known positively about them.

Operation.—Digitalis acts upon the general system in a manner more or less closely similar to tobacco. Its sedative influence is accordingly very powerful, and appears to be exerted more particularly upon the heart. The manner in which the *pulse* becomes modified, however, varies in different cases, being dependent, in a great degree, upon the posture which the patient maintains. It must be kept in mind that, with healthy persons,

not under the influence of this medicine, there is a considerable difference in the rapidity of the pulse, accordingly as they assume the standing, sitting, or lying position; both the general muscular force exerted by the individual, and the quickness of the pulse being greater in the first, than in the two latter instances. Now digitalis, by weakening the heart's energy, exaggerates this natural condition, rendering the pulse slower when in the lying, but often very rapid, weak, and irregular, when in the standing posture. The effect may indeed be so powerful, that the heart may be rendered quite incapable of propelling the blood at all to the head, in opposition to the resistance of gravity; and then either syncope or death must result. Its medicinal use, in small doses, is often accompanied by great muscular relaxation, faintness, and nausea. Digitalis is one of the most certain among vegetable *diuretics.* It is commonly stated that it has a tendency, where long administered, to accumulate in the system, and suddenly to give rise to its full poisonous effects. However, we have never met with any thing of the sort, although patients under our care have constantly used the drug for many months as a sedative in hypertrophy of the heart. We are accordingly willing to believe that its *cumulative* action is very rare, although the possibility of its occurrence ought to be kept in view in prescribing the remedy. Its poisonous effects are manifested by irregularity of the pulse, syncope, confusion of vision, cold sweats, suppressed urine, stupor, convulsions, and coma.

Uses.—Digitalis is prescribed as a sedative in *hypertrophy of the heart*, and *aneurism* of the great vessels proceeding from it. In the former case, we endeavour to lessen palpitation and the violent action which the organ habitually maintains, and this, not only as a point of palliative treatment, but because we hope thus to prevent that further over-growth of the heart which would necessarily accompany it. In the latter instance, the object of the practitioner is to promote the formation of a coagulum within the aneurismal sac, a result which he cannot reasonably expect, unless the blood which it contains be preserved very much in a state of rest. Accordingly, the most rational method to put in practice is to diminish the bulk of the blood by evacuants and restriction of liquids, to keep up its fibrinous condition by the moderate use of animal food, and to lessen the heart's

action which propels it into the sac, by the judicious employment of digitalis. It may readily be conceived a very valuable agent in the treatment of *inflammatory diseases ;* and we have seen it employed with special benefit in pneumonia and peritonitis. In *dropsy* it is, of all the vegetable diuretics, that most entirely to be relied on, especially when it depends on structural disease of the heart. Its operation on the kidneys is much favoured by combination with a mercurial. In *hæmorrhage* it proves highly serviceable as a sedative, and may be combined with acetate of lead, with, perhaps, greater advantage than opium, when the flow of blood is connected with a sthenic condition of the arterial system.

Dose.—Gr. ½ gradually and cautiously increased to grs. iij.

Off. Preps.—*Infusum Digitalis. L. U. S.* (A drachm of dried digitalis macerated in a pint of boiling distilled water and strained, some spirit of cinnamon being subsequently added.) *Dose,* f℥ß—j.

Tinctura Digitalis. L. U. S. (Digitalis, ℥iv., macerated in proof spirit, Oij., and strained.) *Dose,* ♏x., gradually increased. Mr. King, of Saxmundham has been in the habit of giving the tincture with good effect in acute inflammations, in doses of f℥ß—j. ; but an important precaution when thus employing the remedy, is the strict adherence to a *recumbent* posture. Should alarming depression result during the use of digitalis in this or any other form, the most powerful diffusible stimulants should be resorted to.

Extractum Digitalis. L. (Prepared as extract of aconite.) *Dose,* gr. j., cautiously increased.

LABIATÆ.

Lavandula Vera.—The Common Lavender.

Didynamia, Gymnospermia.

A shrub rising to the height of one or two feet, having oblong-linear leaves, which are hoary and revolute at the edges when young. The flowers grow in an interrupted spike, consisting of several whorls of from six to ten. The bilabiate corolla is of a

purplish-gray colour, and the whole plant possesses an agreeable and well-known odour.

Hab.—The South of Europe. Cultivated in England.

LAVANDULA. U. S. (*Flores.*) *L.*

The lavender flowers have a peculiar fragrant *odour*, and a bitter aromatic *taste.*

CHEM. COMP.—Like all the officinal plants belonging to the order labiatæ, lavender flowers contain *tannic acid* and a *volatile oil* besides lignin, etc.—The *oil* is a thin pale fluid, of a fragrant odour; sp. gr. ·877. *Formula,* $C^{15}H^{14}O^2$ or $3\ (C^5H^4) + 2\ HO$.

OPER. AND USES.—Lavender is stimulant and slightly tonic. Its preparations are principally employed with a view to imparting colour and odour to mixtures, lotions, etc.

OFF. PREPS.—*Oleum Lavandulæ. L. E. U.S.* Prepared as the oil of anise.) Only used as a perfume.

Spiritus Lavandulæ. L. E. U.S. (Fresh lavender, ℔ijss., [℔ij., U. S.], distilled with rectified spirit, *cong.* j., and some water, Oij.

Tinctura Lavandulæ Composita. L. Spiritus Lavandulæ Compositus. U.S. (Spirit of lavender, Ojss., [Oiij., U. S.,] and spirit of rosemary, f℥xij., [Oj., U. S.,] macerated with bruised cinnamon, ʒijß, [℥j., U. S.,] nutmeg, ʒijss., [℥ss., U. S.,] and sandal wood, ʒv., [ʒiij., U. S.] A cordial and stomachic. *Dose,* fʒß—ij.

MENTHA PIPERITA.—The Peppermint.

Didynamia, Gymnospermia.

An indigenous herb, having a perennial root and creeping under-ground stems. The aerial stem rises to the height of about two feet, and bears ovate-oblong leaves of a dark-green colour, pointed and serrated. The spikes on which the flowers are arranged are short, obtuse, and interrupted at the base; the calyx, is of a reddish colour, with hairy teeth, and the corolla purple.

MENTHA PIPERITA. L. U.S.

The whole herb is officinal; it has a peculiar aromatic *odour*

and a warm *taste*, followed by a sense of coldness in the mouth during inspiration.

Chem. Comp.—The activity of peppermint is due to its containing *volatile oil*, whose *formula* is $C^{25}H^{22}O^{2}$, or 5 $(C^{5}H^{4}) + 2HO$.—It also contains a little *tannic acid*, indicated by the green colour which its infusion strikes with a persalt of iron.

Oper. and Uses.—Stimulant, aromatic, and carminative. Its preparations are employed for the dispersion of *flatus* in the stomach, or as a vehicle for covering the disagreeable taste of other remedies.

Off. Preps.—*Oleum Menthæ Piperitæ. L. U.S.* (Prepared by distilling the fresh herb with water.) *Dose*, gtt. ij.—v. It may be administered either dropped upon sugar or rubbed with it into a powder.

Spiritus Menthæ Piperitæ. L. (Prepared by distilling the oil, ℨiij., with proof spirit, *cong.* j., and some water, Oj.) It may be equally well prepared by simply dissolving the oil in some spirit. *Dose*, fʒß—ij.

Aqua Menthæ Piperitæ. L. U.S. (Prepared by distilling the dried herb or oil with water and a little proof spirit.) It may be extemporaneously prepared like *aq. carui.* *Dose*, f℥j.—iij.

Mentha Viridis. L. E. U. S.—Spearmint.

Didynamia, Gymnospermia.

This is the mint most commonly cultivated for culinary use, and it agrees with the last in its more essential points of structure. The leaves are of a bright green colour, large, elliptical, and serrated, being either sessile or placed upon very short footstalks. The flowers are small and purplish, and grow in interrupted cylindrical spikes.

Mentha Viridis. L. U. S.

The whole herb is officinal, the *odour* is agreeable, and the *taste* aromatic and rather bitter, followed by a sense of coolness on inspiration.

Chem. Comp.—It contains similar principles to the last, but the *volatile oil* has the *formula* $C^{35} H^{28} O$ or $7 (C^5 H^4) + O$.

Oper. and Uses.—As peppermint.

Off. Preps.—*Oleum Menthæ Viridis.* *Spiritus Menthæ Viridis.* *Aqua Menthæ Viridis.*	Preparation, operation, etc., as the similar preps. of peppermint.

Mentha Pulegium.—The Penny-royal.

Didynamia, Gymnospermia

This is a perennial plant, agreeing with the two former in all essential points of structure. It has slender and procumbent stems, however; the leaves are ovate. Its flowers are small, of a pale purple colour, and surrounding the stem in distant globose whorls.

Hab.—Europe, Chili, &c.

Mentha Pulegium. L.

The whole herb is officinal. It has a disagreeable *odour* and bitterish aromatic *taste*, followed like the other mints by a sense of coldness on inspiration.

Chem. Comp.—It contains principles similar to the two last, its *volatile oil* having the *formula* $2 (C^5 H^4.)$

Oper. and Uses.—As peppermint; rarely used.

Off. Preps.—As the two former.

Rosmarinus Officinalis.—The Common Rosemary.

Diandria, Monogynia.

A shrubby plant, rising to the height of six or eight feet: its leaves are linear, sessile, revolute at the edge, and hoary beneath; they are placed in whorls upon the branches. It bears large pale purple flowers, and the superior stamens are abortive; the lips of the corolla are nearly equal, the upper one erect and emarginate, the lower spreading and trifid, with the lateral lobes erect and somewhat twisted, while the middle one is very large, concave, and dependent.

Hab.—South of Europe. Cultivated in this country.

ROSMARINUS. U. S. (*Cacumina.*) *L.*

The flowering tops are officinal: they have a strong and camphoraceous *odour*, and a bitter aromatic *taste.*

CHEM. COMP.—The medicinal value of rosemary depends upon the *volatile oil* which it contains; its *formula* is 9 (C^5 H^4)+2 H O.

OPER. AND USES.—Its preparations are employed as a perfuming ingredient for lotions and liniments.

OFF. PREPS.—*Oleum Rosmarini. L. U. S.* (Prepared by distilling the tops with water.)

Spiritus Rosmarini. L. U. S. (Prepared by distilling the oil, ʒij., with spirit, *cong.* j., and a little water, Oj.) Prepared extemporaneously, as sp. menthæ pip.

MARRUBIUM VULGARE.—Horehound.

Didynamia, Gymnospermia.

An indigenous bi-labiate plant, with a strong upright stalk, bearing ovate and crenated leaves. Its flowers are white and arranged in whorls. Every part of the plant is white and woolly.

MARRUBIUM. L. U. S.

The whole herb is officinal. It has a peculiar aromatic *odour*, and very bitter *taste.*

CHEM. COMP.—Its medicinal value depends on the possession of *volatile oil*, and a *bitter extractive* matter it contains.

OPER. AND USES.—It is tonic and slightly stimulant, and has long been in repute as an expectorant in *chronic bronchitis* and *phthisis.* It is administered in the form of infusion.

ORIGANUM VULGARE.—The Common Marjoram.

Didynamia, Gymnospermia.

An indigenous herb, having an erect villous stem, and ovate, obtuse, and subserrate leaves, which are also rather hairy. Its

flowers are of a light purple colour, and are collected by imbricated, obtuse, and coloured bracts into roundish spikes, which are clustered in corymbose panicles.

Origanum. L. U.S.

The whole herb is officinal. It has a peculiar aromatic *odour*, and a warm pungent *taste*.

Chem. Comp.—The value of marjoram is due to the *volatile oil* it contains, having the *formula* 10 ($C^5 H^4$) + O.

Oper. and Uses.—As rosemary.

Off. Prep.—*Oleum Origani. L. U.S.* Preparation and uses as *ol. rosmarini.*

[Hedeoma Pulegioides.—American Penny-royal.

Diandria, Monogynia.

A small annual somewhat pubescent plant, with many slender erect branches. The leaves are opposite, oblong lanceolate or sub-oval. The flowers are in axillary whorls along the branches, of a whitish colour, small. The seeds are four, in the persistent calyx, being retained in place by the ciliate bristles of its lower lip.

Hab.—United States, in dry situations.

Hedeoma. U.S.

The whole herb is officinal, it has a very strong, pungent smell, and a warm but scarcely aromatic taste.

Chem. Prop.—No analysis has been made of it, but it owes its properties to a volatile oil, which is probably similar in composition to that of the other labiate plants.

Oper. and Uses.—It is a gentle stimulant aromatic, and may be given in cases where such remedies are required. Its warm infusion promotes diaphoresis, and the flow of the menses, and has some reputation in domestic practice as an enmenagogue.

Off. Prep.—*Oleum Hedeomæ. U.S.* Prepared like ol. rosmarini.

Monarda Punctata.—Horse Mint.

Diandria, Monogynia.

A biennial or perennial labiate plant, with an erect, angled stem, which is pubescent and whitish, and furnished with many branches, having oblong-lanceolate, serrate, punctate leaves. The flowers are yellow, dotted with reddish-brown, collected in bracteate whorls. It flowers from June to September.

Hab.—United States in sandy soils.

Monarda. U. S.

The whole herb is officinal. It has a peculiar aromatic odour, and a warm, pungent, somewhat bitter taste, and abounds in volatile oil.

Chem. Comp.—The medicinal properties depend on the volatile oil. This oil often deposits a crystalline substance, *monardin*, of a very pungent taste, fusible at 118° F., and boils at 418° F.; it is soluble in alcohol, ether, and the oils, both fixed and volatile. (*Amer. Jour. Pharm.* xi.)

Oper. and Uses.—Monarda is a stimulant and carminative of some activity, but is seldom used in regular practice. The oil is very powerful, and forms an excellent rubefacient, where counter-irritation is indicated.

Off. Prep.—*Oleum Monardæ. U. S.* Prepared like ol. rosmarini.]

POLYGONACEÆ.

Rumex Acetosa.—The Common Sorrel.

Hexandria, Trigynia.

The leaves of this plant are officinal for the purpose of preparing an acid drink for febrile diseases. They used also formerly to be the source from which oxalic acid was obtained.

Polygonum Bistorta.—The Bistort.

Octandria, Trigynia.

An indigenous herbaceous plant, with a simple stem, terminating in a single thick and blunt spike of small rose-coloured flowers, the calyx being persistent and deeply cut. Its leaves are ovate and wavy, running down into the footstalks.

Bistorta. Dub. (*Radix.*)

Description.—The plant derives its specific name from the *form* of the root, which is twice bent upon itself, *bis-torta;* it is about the thickness of the finger, and rugose externally. *Colour,* brown externally, but of a reddish or flesh colour internally. *Consistence,* firm. *Taste,* very astringent.

Chem. Comp. and Rel.—Bistort owes its medicinal properties to the *tannic acid* which it contains; besides which, it has starch, colouring matter, lignin, and oxalate of lime among its constituents. The decoction gives the reaction due to the presence of tannic acid and starch.

Oper. and Uses.—The bistort is powerfully astringent, and has been strongly recommended for use in all those diseases for which the most energetic vegetable astringents are employed.

Dose.—Of the powder, grs. xx.—xl. It may be administered also in the form of decoction.

Rheum.—One or more species yielding Rhubarb.

Enneandria, Monogynia.

Much discussion has arisen with regard to the species of Rheum which affords the rhubarb of commerce. It appears probable, however, that the reference of the London College is correct as to one variety of the drug, and that Turkey rhubarb is the produce of the *R. palmatum.*

The genus Rheum resembles in its general aspect the genus Rumex, occupying in Asia the place which the Docks take in

this country. The winged achenium which the former bears is alone sufficient to distinguish the genera. The leaves of all are very large; those of the *R. palmatum* rounded, cordate, and half palmate, with pinnatifid acuminate lobes; they are uneven but not wavy, and are very much wrinkled on the upper side. This species also has taller flowering stems than any other.

The other species to which the drug has been referred, with any appearance of probability, are the *R. compactum*, as furnishing the East Indian, and *R. emodi*, found growing in abundance on the Himalayan Mountains.—The leaf of the *compactum* is heart-shaped, obtuse, very wavy, and scabrous on the margin. It is of a thick texture, and glossy and even on the upper side. The leaf of the *emodi* is also cordate, but acute and flattish; it is very much wrinkled, distinctly rough, with short hairs on each side and only a little wavy.

Rheum. U.S. (*Radix.*) *L.*

Description.—There are three principal varieties of rhubarb, namely, the *Turkey or Russian*, which comes to us from St. Petersburgh; the *East Indian or Chinese*, imported from Canton and the East Indies, and the *English*, grown in this country, and prepared from the roots principally of the *R. palmatum.*

1. Russian or Turkey.—*Form*, rounded, flattened, or irregular, the surface more or less angular, as if the cortex had been removed by *slicing. Size* of the pieces, various. *A large hole* is bored through the pieces, sometimes extending only as far as the centre. *Colour*, externally reddish-white, and veined in a reticular manner; this is obscured by a yellow dust which covers the pieces. *Consistence*, compact. *Fracture*, uneven, exhibiting reddish-brown veins, undulating on the transverse, and running longitudinally on the longitudinal fracture. *Odour*, aromatic, strong, and peculiar. *Taste*, slightly astringent, bitter, and peculiar: it is gritty when chewed, and tinges the saliva yellow. *Colour of the powder*, a bright buff-yellow.

2. Chinese, or East Indian.—*Form*, round or flat, the surface not angular, the cortex having been apparently *scraped* off; occasionally, portions of it are found remaining. *A small hole* is

pierced through the pieces, which sometimes contains a portion of the cord by which they had been suspended. *Colour*, a yellowish-brown, less regularly reticulated, covered with a yellow dust. *Consistence*, more compact than the Turkey. *Fracture*, uneven, and having the veins in a less determinate direction. *Odour* and *taste*, as the Turkey. *Colour of the powder*, between a fawn and an orange-yellow.

3. English.—*Form*, variously shaped pieces and sticks: the surface presenting brownish spots of adhering bark. *A hole* is occasionally pierced through the pieces, so as to represent Russian rhubarb. *Colour*, reddish, and sometimes covered with turmeric powder. *Consistence*, spongy. *Fracture*, presents streaks more radiated from the centre than the other varieties. *Taste*, less gritty, when chewed. *Colour of the powder*, a dingy yellow.

Preparation of Turkey Rhubarb.—The roots are cut into pieces, and a hole bored through them, to allow of their suspension in the sunshine for drying. Sometimes, it appears, they are dried by artificial heat, or in the shade. The rhubarb thus prepared is carried by the Bucharian merchants to Kiachta, on the Russian frontiers, where it is sold to the Russian government. Only the soundest pieces are taken, an official being stationed at that town for the purpose of examining them; and the partial holes found in some were probably made with this view. All the rejected pieces are burned.

Chem. Comp.—The composition of rhubarb is by no means well understood: but several analyses have shown that it contains a colouring matter, called *rheine*, *rhabarberine* or *rhabarberic acid*, *bitter extractive matters*, *tannic*, *gallic*, and *oxalic acids*, *gum*, and *woody fibre*, together with *oxalate* and *phosphate of lime*, etc. *Rhabarberic acid* assumes the form of a yellow amorphous powder, without odour or taste; when heated, it fuses into a yellow liquid, and carbonizes, without giving off ammonia. It is very little soluble in cold water, rather more so in boiling water, but still more in alcohol; and the solutions redden litmus, and are rendered of a dark red colour by alkalies. This substance has been supposed to be the active principle of the drug, but this is doubtful. *Bitter principle:* more than one substance has been thus termed, but all are probably mixtures of several ingredients. It is not known on what the *odour* of rhubarb depends. *Oxalate*

of lime exists in the drug in the form of crystals, which are known as *raphides:* they exist in greatest quantities in the Russian and Chinese varieties.

Chem. Rel.—An infusion of rhubarb exhibits reactions depending on the tannic, gallic, and rhabarberic acids which it contains; thus, it strikes a dark green colour with *persalts of iron*, precipitates *gelatine* and *vegetable alkaloids*, and is rendered of a dark red colour by alkalies.

Adulteration.—The only adulteration to which rhubarb is subjected is the admixture, or entire *substitution of the English* for the foreign varieties. It is recognised by its spongy texture, the brown specks which it exhibits externally, and its want of grittiness.

Operation.—In full medicinal doses rhubarb is pretty actively cathartic, operating, however, more by an increase of the peristaltic motions of the canal, than by augmenting the intestinal secretions. The stools which it produces are accordingly feculent, and, since the drug contains astringent principles, its operation is followed by a more or less confined condition of the bowels. Its colouring matter enters the circulation along with its other active ingredients, and, being discharged by the urine, imparts to it a red colour. In smaller doses, rhubarb is tonic and aromatic.

Uses.—As a purgative it is well adapted to *delicate and debilitated subjects*, as well as for administration to children, and tends also to allay some forms of *diarrhœa* by discharging irritating matters from the canal. Its subsequent astringent effect renders it doubly serviceable in cases such as these. In the treatment of this latter affection, also, it is often advantageously conjoined with chalk, hydrargyrum cum cretâ, magnesia, or aromatic confection. It sometimes appears serviceable in *atonic dyspepsia*, accompanied by constipated bowels.

Dose.—Grs. v.—℈j., according to the effect desired.

Off. Preps.—*Infusum Rhei. L. U. S.* (Sliced rhubarb, ℈iij., [℈j., U. S.,] macerated in boiling distilled water, Oj., [Oss., U. S.,] and strained.) Mildly tonic and laxative. *Dose*, f℥ß—℥j.

Extractum Rhei. L. (Powdered rhubarb, ℥xv., is macerated in distilled water, Ovij., with the addition of some proof spirit, Oj., and strained: the liquor is then set by to deposit its dregs, and

the clear solution, being poured off, is evaporated to a proper consistence.) *Dose*, gr. x.—ʒß.

Tinctura Rhei Composita. L. (Sliced rhubarb, ℥ijss., bruised liquorice, ʒvj., ginger, ʒiij., and saffron, ʒiij., macerated in proof spirit, Oij., and strained.) Dose, fʒj.—f℥j., according to the effect desired.

Pilulæ Rhei Compositæ. L. U.S. (Powdered rhubarb, ℥j., aloes, ʒvj., and myrrh, ℥ss., beaten into a mass with some soap, ʒj., oil of caraway, fʒss., and syrup, q. s., [syrup of orange peel, U.S.]) A very useful purgative pill in dyspepsia, amenorrhœa, etc. *Dose*, grs. v.—xx.

[*Pilulæ Rhei. U.S.* Powdered rhubarb, ʒvj., soap, ʒij.; mix, and divide into 120 pills. Stomachic and purgative.

Tinctura Rhei. U.S. Rhubarb, in coarse powder, ʒiij., cardamom seeds, bruised, ℥ss., diluted alcohol, Oij.; make tincture by displacement. *Dose*, ʒj.—℥j.

Tinctura Rhei et Aloes. U.S. Rhubarb in coarse powder, ʒx., aloes, ʒvj., cardamom seeds, bruised, ℥ss., diluted alcohol, Oij.; proceed as above. *Dose*, f℥ss.—j.

Tinctura Rhei et Gentianæ. U.S. Rhubarb in coarse powder, ʒij., gentian in coarse powder, ʒss., diluted alcohol, Oij.; proceed as above. *Dose*, fʒj.—iij.

Vinum Rhei. U.S. Rhubarb, bruised, ℥ij., canella, bruised, ʒj., diluted alcohol, f℥ij., wine, Oj.; macerate and filter. *Dose*, fʒj.—f℥j.

Syrupus Rhei. U.S. Rhubarb bruised, ℥ij., boiling water, Oj., sugar, ℔ij.; macerate the rhubarb in the water, strain, add the sugar, and make a syrup. *Dose*, fʒj.—f℥j.

Syrupus Rhei Aromaticus. U.S. Rhubarb, bruised, ℥ijss., cloves and cinnamon, bruised, each, ℥ss., nutmeg, bruised, ʒij., diluted alcohol, Oij., syrup, Ovj.; macerate rhubarb and spices in alcohol, strain, evaporate to Oj., add syrup. *Dose*, fʒj.—f℥j.]

THYMELACEÆ.

Daphne Mezereum.—The Mezereon.

Octandria, Monogynia.

A hardy shrub, indigenous to some parts of England, and commonly cultivated in gardens for the fragrance of its flowers; they surround the branches in thick clusters in the spring, previous to the appearance of the leaves, and have a purple tubular calyx, with the limb divided into four oval segments. The leaves are few and lanceolate, appearing at the termination of the branches after the flowers have expanded.

Hab.—Europe.

Mezereum. U. S. (*Radicis cortex.*) L.

Description.—The bark of the root, which is the officinal part of the plant, is met with in the *form* of thin, flat, or quilled pieces, of a brown *colour*, externally, but white and cottony, internally: it is of a tough, fibrous *consistence*, and the *taste* is sweetish at first, but subsequently acrid.

Chem. Comp.—It contains an *acrid resin*, to which it appears to owe its medicinal properties, besides which, a neutral crystallizable substance called *daphnine*, having a bitter and slightly astringent taste, but it has no peculiar action on the system. *Wax, extractive* and *colouring matters*, as well as *salts with malic acid*, are contained in the bark.

Operation.—The only thing certain upon this head is that mezereon is a topical irritant, producing redness and vesication when bound in a moistened state upon the skin. It also acts as an acrid poison when swallowed in any large quantity. It has been reputed, moreover, diuretic and diaphoretic. It has also had the vague term of *alterative* applied to it.

Uses.—It has been employed in a variety of *chronic diseases*, syphilitic, scrofulous, and rheumatic, and also for the cure of obstinate *cutaneous diseases*. However, it is no easy matter to place a value upon the remedy, when we consider the powerful influence of time and regimen in the removal of chronic dis-

eases generally, and the simultaneous use of dietetic and regimenal restrictions, with change of air, etc., by persons treated by this medicine. It may be administered in the form of decoction; and it enters into the composition of *compound decoction of sarsaparilla.*

MYRISTICACEÆ.

Myristica Moschata.—The Nutmeg-tree.

Diœcia, Monadelphia.

[A small tree, somewhat resembling the pear. The leaves are aromatic, oblong acuminate, smooth. The flowers are unisexual, of a yellowish colour. The fruit is pear-shaped, externally, smooth, marked with a groove, fleshy, dividing by two longitudinal valves, containing one seed surrounded by a fleshy, reddish arillus. Nut, with a dark brown, brittle, outer coat, marked by the arillus; substance oleaginous.]

Hab.—The Moluccas.

Myristica. U. S. (*Nuclei.*) L.

Both *nutmegs* and *mace* (the arillus surrounding the nutmeg) are officinal, and too well known to require further description. They are orginally enclosed in a fleshy pericarp, which is stripped off, and the mace removed and flattened previous to exportation.

Chem. Comp.—Besides woody fibre, starch, and gum, nutmegs contain about 31 per cent. of a *fixed oil,* of the consistence of butter (called butter of nutmegs), and 6 per cent. of *volatile oil.*—The *volatile oil* is of a slightly yellow colour, a little viscid and possessing a strong odour of nutmegs; sp. gr. ·948. It consists of two oils, the one heavy and the other light: by keeping, the oil deposits crystals of *myristicine.*—The *fixed oil* consists in great part of a solid fat, very soluble in alcohol, and containing an acid called the *sericic,* united with glycerine. Sericic acid occurs in brilliant crystals of a silky lustre, fusing at 120°; having the *formula* HO, $C^{28} H^{28} O^{3}$.—*Mace* has a very similar

composition to that of nutmegs, possessing both fixed and volatile oil similar to those above described.

Oper. and Uses.—Nutmeg and mace are stimulant and aromatic, chiefly employed as additions to purgative medicines in flatulence and diarrhœa.

Off. Prep.—*Spiritus Myristicæ. L. U.S.* (Bruised, nutmeg, ℨijss. [ℨij. U. S.], distilled with proof spirit, *cong.* j., and some water, Oij.) *Dose*, fℨj.—iv.

Myristicæ Oleum. (*Oleum è nucleis destillatum.*) *L.*

This is the volatile oil obtained by distillation of powdered nutmegs with water. Its *use* is the same with other aromatic volatile oils.

LAURACEÆ.

Cinnamomum Zeylanicum.—The Cinnamon Tree.

Enneandria, Monogynia.

This is an elegant tree, rising to the height of above twenty feet, with opposite leaves, ovate-oblong and three-nerved. Its flowers are hermaphrodite or polygamous, silky and hoary, growing in terminal or axillary panicles: the calyx is 6-cleft and its limb is deciduous; the stamens are twelve in number, arranged in four rows, the three inner being abortive, and the next three having two sessile glands at their base.

Hab.—Ceylon, Sumatra, Borneo, and the Malabar coast. Cultivated in Java, the West Indies, etc.

Cinnamomum. U.S. (*Cortex.*) *L.*

Description.—*Form*, rolls consisting of quills inserted one into another, several being in the same roll. *Thickness* of the quills, about that of cartridge-paper, *length* of the rolls sometimes two or three feet. *Colour* externally, yellowish-brown; somewhat darker internally. *Fracture*, splintery, especially in the longitudinal direction. *Odour*, fragrant. *Taste*, peculiar, sweet, astringent, and pungent.

Preparation.—The bark is taken from the middle-sized twigs, and the epidermis and pulpy matter beneath is scraped off. It then curls into quills, which are introduced one within another before they become dry and hard.

Chem. Comp.—Cinnamon contains a large quantity of *volatile oil*, a soft aromatic *resin* and *tannin*, besides gum, woody fibre, etc.

Chem. Rel.—The infusion produces a precipitate with a solution of *gelatine* and strikes a greenish-blue colour with *salts of iron*, from the tannic acid it contains.

Adulteration.—*Cassia* is commonly met with in the shops under the name of cinnamon. It is recognised by being thicker than true cinnamon, and being mucilaginous when chewed. The only difference between them depends on the pulpy matter beneath the epidermis not being scraped off.

Oper. and Uses.—Cinnamon is aromatic and astringent: the latter property renders it very useful in the *diarrhœa of infants*. In consequence of its agreeable flavour, it becomes a pleasant adjunct to other more active medicines, while the operation which some have maintained that it exercises over the uterine contractions, adapts it as a vehicle for powdered ergot during the progress of labour.

Dose.—Grs. x.—℈ß.

Off. Preps.—*Pulvis Cinnamomi Compositus. L. Pulvis Aromaticus. U. S.* (Cinnamon, ℈ij., cardamom, ʒjss., [ʒj., U.S.], ginger, ʒj., [ʒij., U. S.], and long pepper, ℈ß, [nutmeg, ℈j., U. S.], rubbed together into a powder.) *Dose*, grs. x.—xxx.

Aqua Cinnamomi. L. U.S. (Bruised cinnamon, ℔jß, or oil of cinnamon, ℈ij., distilled with water, *cong.* ij., and a little proof spirit, fʒxij.) Extemporaneously prepared as the other distilled waters. *Dose*, fʒß—ij.

Tinctura Cinnamomi. L. U.S. (Bruised cinnamon, ℈iijss., [℈iij., U.S.], macerated in proof spirit, Oij., and strained.) *Dose*, f℈j.—iv.

Tinctura Cinnamomi Composita. L. U.S. (Bruised cinnamon, ℈j., and cardamom, ʒss., powdered long pepper, ℈ijss., [none, U.S.], and sliced ginger, ℈ijß, [℈iij., U.S.], macerated in proof spirit, Oij., and strained.) *Dose*, f℈j.—ij.

Cinnamomi Oleum. U.S. (*Oleum è cortice destillatum.*) *L.*

Description.—The best oil of cinnamon is of a light yellow *colour*, but becomes of a reddish-brown when exposed. It has a strong *odour* of cinnamon, and a sweet burning *taste.*

Preparation.—It is imported from Ceylon, where it is obtained by distillation of the inferior pieces of the bark with water.

Chem. Comp.—According to Mulder, it has the *formula* $C^{20}H^{11}O^{2}$. By the action of oxygen, *cinnamic acid* ($HO, C^{18}H^{7}O^{3}$), two *resins* and a new volatile oil ($C^{18}H^{8}O^{2}$) are formed.

Oper. and Uses.—As the other essential oils.

Dose.—♏ij.—iij.

Off. Prep.—*Spiritus Cinnamomi. L.* (Oil of cinnamon, ℨij., mixed with proof spirit, *cong.* j., and some water, Oj., and distilled.) *Dose*, f℥j.—iv.

Sassafras Officinale.—The Sassafras Tree.

Enneandria, Monogynia.

This tree grows to the height sometimes of twenty or thirty feet, and is divided towards the top into several crooked branches. Its leaves are alternate and deciduous, some being oval and entire, while others are cut into two or three lobes; they are of a pale green colour and downy on the under side. It bears yellow flowers, which are diœcious and grow in pendant racemes from the extremities of the shoots of the preceding year.

Hab.—Canada and the United States.

Sassafras. U.S. (*Radix.*) *L.*

Description.—The wood and bark of the root are both used medicinally. The wood is light and porous, of a grayish-yellow *colour*, possessing, like the bark, but less strongly, an agreeable *odour*, like that of sweet fennel, and a warm aromatic *taste.* The bark is of a grayish-brown colour, and rusty within.

Chem. Comp.—Both the wood and bark contain *volatile oil.*

Oper. and Uses.—Stimulant and sudorific, and is employed in *rheumatic* and *syphilitic* diseases, conjoined, for the most part, with sarsaparilla or guaiacum. Chronic *cutaneous diseases* are sometimes benefited by its use.

Off. Prep.—*Oleum Sassafras. U. S.* (The bark distilled with water, used in compound extract of sarsaparilla.)

Laurus Nobilis.—The Sweet Bay.

Enneandria, Monogynia.

A small tree with elliptical evergreen leaves, wavy at the margin and somewhat coriaceous. Its flowers are hermaphrodite, or diœcious, and yellowish, standing in clusters of three or four together, upon short peduncles in the axils of the leaves.

Hab.—South of Europe. Cultivated in this country.

Lauri Baccæ. L.

The berries are about the *size* of the kernel of the hazel-nut, and are of a deep brownish-black *colour*. They contain a concrete *volatile oil*, on which their virtue depends. They are aromatic and stimulant.

Lauri Folia. L.

The dried leaves have a bitter aromatic *taste*, and an aromatic *odour*. They also contain *volatile oil* and properties similar to the berries.

Bebeerina.

An alkaloid discovered by Dr. Rodie, in the Bebeeru or greenheart tree of British Guiana, said to belong to the natural order Lauraceæ.

This alkaloid has not yet been procured in a crystallized state, but as a brown mass. It is soluble in alcohol, and combines with acids, forming crystallizable salts. The sulphate is an article of commerce, usually found in brown crystalline scales, soluble in water, sparingly so in alcohol, and possessing an in-

tensely bitter taste; the solutions of the salt are neutral, and ammonia precipitates the alkaloid. On analysis, pure Bebeerina gives, in 100 parts, carbon 72·22, hydrogen 6·62, nitrogen 4·30, oxygen 17·02; and its formula is $C^{35} H^{20} N O^{6}$, so that it is isomeric with morphia (*Tilley*).

Oper. and Uses.—Bebeerina was introduced into this country by Dr. Maclagen as a *substitute for the sulphate of quina;* its price being about one-half that of the latter. It appears, from many trials, to possess all the antiperiodic properties of quina, and has been found of the greatest service in intermittent fevers, and the various forms of neuralgia. It is said also not to produce the unpleasant effects which sometimes result from the use of that alkaloid.

Dose.—Of the sulphate of bebeerina, the same as that of sulphate of quina.

Camphora Officinarum.—The Camphor Tree.

Enneandria, Monogynia.

A tree growing to a considerable height, and bearing yellowish-green evergreen leaves, oval and pointed in form, standing upon long footstalks, and shining on the upper, but glaucous on the under surface. Its flowers are hermaphrodite, small, and white, arranged in corymbose panicles, either terminal or axillary to the leaves. The odour of the whole plant indicates its impregnation with camphor.

Hab.—China, Japan, and Cochin-China.

Camphora. U. S. (*Concretum sui generis, sublimatione purificatum.*) *L.*

Description.—*Form*, hemispherical, concavo-convex cakes, perforated in the centre. *Colour*, white and translucent. *Consistence*, tough and crystalline in texture; it is difficult to pulverize, unless the process be assisted by the addition of a few drops of alcohol. *Odour*, peculiar, very diffusible and penetrating. *Taste*, bitter and pungent.

Preparation, etc.—The wood of the tree is chopped into

pieces and boiled with water; and the camphor which distils over is condensed upon straws placed across the upper part of the alembic. With the view of purifying it, the dirty grayish grains of crude camphor are melted on a sand-bath, in spheroidal glass vessels, called *bomboloes*, lime being added to it when liquid. The pure camphor sublimes upon the upper part of the vessel, while the lime, retaining a little camphor, is left. Water sprinkled upon the glass cracks it, and the cake is removed and trimmed by scraping.

Chem. Comp.—Camphor may be represented by the *formula*, $C^{20}H^{16}O^{2}$.

Chem. Rel.—Camphor has sp. gr. 0·98, is volatile at ordinary temperatures, fuses at 347°, and burns readily with a white flame. It is very slightly *soluble* in water, which does not take up more than $\frac{1}{1000}$th; it is very soluble in alcohol, ether, and the fixed and volatile oils; water added to these solutions causes the precipitation of the camphor. Camphor has a great analogy to the volatile oils. *Nitric acid* converts it into camphoric acid ($3HO, C^{30}H^{21}O^{9}$). Distilled with *anhydrous phosphoric acid*, it is converted into a liquid called camphogene ($C^{20}H^{14}$).

Borneo Camphor.—The substance which is known under this name is the product of the Dryabalanops aromatica, a plant of the nat. ord. Guttiferæ, growing in Borneo and Sumatra. The camphor is found in crystalline masses in cavities in the wood of the larger trees. Although in great measure agreeing with common camphor in its taste and odour, it differs from it in its chalk-white colour and greater opacity. It occurs in foliaceous friable plates, which are pulverizable without addition of alcohol, and which sink in water, being of greater sp. gr. than that liquid. It is also less disposed than ordinary camphor to spontaneous sublimation. Its *formula* is $C^{20}H^{18}O^{2}$.

Operation.—Much doubt hangs about the therapeutical operation of camphor. It appears to occupy an intermediate position between the volatile oils and the narcotics, differing from the former in the possession of sedative powers, and from the latter in its more distinctly stimulant effects. It is unquestionably a topical excitant, and produces a sensation of warmth in the throat and epigastrium when taken into the stomach. Its stimulant action, however, appears to vary, but is yet mostly

perceptible in increasing the general temperature of the surface, and often giving rise to diaphoresis. Its sedative influence is most probably distinct from this, although Dr. A. T. Thomson looks upon it merely as a secondary effect to the stimulant operation. It is observed rather after moderately large than after small doses, diminishing pain and spasm, or, if administered in excessive quantities, inducing giddiness, confusion of ideas, drowsiness, delirium, and stupor, interrupted by occasional convulsions. The odour of camphor becomes perceptible in the sweat and pulmonary exhalations, but has not been detected in the urine.

Uses.—The employment of camphor in the treatment of disease is almost entirely empirical. The declining stage of *typhus*, and the allied condition of the system in the malignant forms of the *exanthematous fevers*, accompanied by delirium, subsultus tendinum, hiccup, etc., present indications for its use. It is exhibited also as an anodyne in certain painful affections, such as *neuralgia* and *dysmenorrhœa*. In the former of these diseases, and in some forms of rheumatism, it is employed topically as a rubefacient. Dissolved in spirit, it is a favourite application to chilblains.

Dose.—Grs. iij.—x., or more.

Off. Preps.—*Mistura Camphoræ. L.* (Camphor, ℈ss., is powdered by the aid of a few drops of rectified spirit, ♏x., and then rubbed with the water, Oj., and the solution strained through linen.) Of little use except as a vehicle for other medicines. *Dose*, f℥j.—ij.

[*Aqua Camphoræ. U.S.* (Camphor, ℨij.; alcohol, ♏xl.; carbonate of magnesia, ℨj.; distilled water, Oij. Rub the camphor with the alcohol, then with the magnesia, and lastly with the water; filter.)]

Tinctura Camphoræ. L. U.S. (Camphor, ℥v., [℥iv., U.S.] dissolved in rectified spirit, Oij.) *Dose*, ♏x.—fℨß. This preparation may be administered internally in water, by suspending the camphor precipitated from it by means of some mucilage. It is commonly used as an external application in the cases noticed above.

Tinctura Camphoræ Composita. L. Tinc. Opii Camphorata. U.S. (Camphor, ℈ijss.; powdered opium, grs. lxxij.; benzoic

acid, grs. lxxij., and oil of anise, f℥j., are macerated in proof spirit, Oij., and strained.) This preparation is in common use as an opiate, especially in pulmonary affections, where the stimulant ingredients it contains are not likely to prove hurtful. A fluid ounce contains about two grains of opium. *Dose*, f℥j.—f℥ss.

Linimentum Camphoræ. L. U.S. (Camphor, ℥j., dissolved in olive oil, f℥iv.)

Linimentum Camphoræ Compositum. L. (Solution of ammonia, f℥vijss., distilled with spirit of lavender, Oj., and camphor, ℥ijss., dissolved in the distilled liquid.) A more stimulating liniment than the former.

ARISTOLOCHIACEÆ.

Aristolochia Serpentaria.—The Virginia Snake-root.

Gynandria, Hexandria.

A perennial plant, seldom attaining a greater height than eight or ten inches, with a crooked or jointed stem, and cordate pubescent leaves. The flowers are solitary, and grow from the lower articulations of the stem. The calyx is of a purplish-brown colour, and remarkably contorted in its shape, ventricose at the base, contracted and twisted in the middle, and at the extremity spreading and triangular.

Hab.—The southern and middle parts of the United States, but chiefly in the Western States.

Serpentaria. U. S. (*Radix.*) *L.*

Description.—It is met with in the *form* of a root-stock, from which numerous fibrous radicles proceed, of a pale, grayish-brown *colour*. The *odour* is aromatic and camphoraceous, and the *taste* warm, bitter, and camphoraceous.

Chem. Comp.—Snakeroot owes its medicinal properties to *volatile oil*, *resin*, and the *bitter extractive matters* which it contains; besides which, there exist in the root, starch, woody fibre, salts, etc.

Oper. and Uses.—It resembles camphor very much in its action on the system. The prominent operation is stimulant, increasing the frequency and fulness of the pulse and the general temperature of the body. The secretions of the skin and kidneys are also said to be augmented under its influence. It is not much in use at present, [it is much employed in the United States,] but has been employed successfully as an excitant in typhoid and *malignant fevers.*

Dose.—Grs. x.—xxx.

Off. Preps.—*Infusum Serpentariæ. L. U. S.* (Snakeroot, ℥ß, infused in boiling water, Oj.) *Dose,* f℥j.—ij.

Tinctura Serpentariæ. L. U. S. (Bruised snakeroot, ℥iijß [℥iij. U. S.], macerated in proof spirit, Oij.) *Dose,* f℥j.—ij.

Asarum Europæum.—The Common Asarabacca.

Dodecandria, Monogynia.

A perennial herb, with an underground rhizome, giving rise to a number of short, aerial stems, each terminating in a pair of kidney-shaped and petiolated leaves, from the angle of which arises a large, single, campanulate, and drooping flower, with a brownish, 5-lobed calyx.

Hab.—Many parts of Europe.

Asarum (*Folia*). *L.*

Oper. and Uses.—The whole plant abounds in acrid properties. Its only medicinal importance, however, depends on its errhine operation when the powder is snuffed into the nostrils.

EUPHORBIACEÆ.

Croton Eleuteria.—The Sea-side Balsam.

Monœcia, Monadelphia.

[A small shrub, with somewhat angular branches, and alternate, ovate, entire leaves, silvery beneath. Fruit, about the size of a pea, three-celled, and six-valved.]

The reference of cascarilla bark by the London College to the Croton *cascarilla* has been proved erroneous.

Hab.—Jamaica and the Bahamas.

Cascarilla. U. S. (*Cortex.*) *L.*

Description.—*Form,* thin quills or fragments seldom more than 3 or 4 inches in length, the surface being cracked both lengthways and transversely. *Colour* externally, gray, with portions almost white. *Consistence,* dense and brittle. *Odour,* aromatic and very agreeable when burned. *Taste,* bitter, spicy, and pungent.

Commercial Source.—The Bahamas.

Chem. Comp.—Cascarilla contains a little *volatile oil, resin,* and a *bitter extractive* matter: to these it owes its medicinal properties; but besides these we find gummy matters, woody fibre, and *chloride of potassium.* A principle called *cascarilline* has also been said to exist in it.

Oper. and Uses.—It is an aromatic tonic, well fitted for use in some forms of *dyspepsia,* being often borne by the stomach when other and more powerful remedies of the class are rejected.

Dose.—Grs. x.—ʒß.

Off. Preps.—*Infusum Cascarillæ. L. U. S.* (Bruised cascarilla, ℥jß [℥j. U. S.], infused in boiling water, Oj.) *Dose,* f℥j.—ij.

Tinctura Cascarillæ. L. (Bruised cascarilla, ℥v., macerated in proof spirit, Oij.) *Dose,* fʒj.—ij.

Mistura Cascarillæ Composita. L. (Compound tincture of camphor, fʒij., vinegar of squill, fʒj., and infusion of cascarilla, f℥xvij.) A tonic expectorant and sedative, well fitted for some of the chronic winter coughs of old persons. *Dose,* f℥j.—jß.

Croton Tiglium.—The Purging Croton.

Monœcia, Monadelphia.

[A small tree, with oblong, acuminate leaves, with two flat glands at base. The raceme of flowers is terminal. Petals, white. Stamina, fifteen, distinct. Capsule, three-seeded.]

Hab.—Hindostan, Ceylon, and the Moluccas.

Oleum Tiglii. U. S. (*Oleum è seminibus expressum.*) *L.*

Description.—The oil is about the thickness of castor oil, and

of a pale amber *colour*. It has no *odour*, but a peculiar acrid *taste*.

Preparation.—The seeds from which it is obtained are about the size and shape of castor seeds, ovoid in form, and with a reddish-brown testa marked by the ramifications of the raphe. They are deprived of their shells, and after being bruised to a pulp are submitted to a strong pressure.

Chem. Comp.—Croton oil seeds contain an *acrid matter* and a *bland oil*, besides woody fibre, gum, albumen, etc. According to Nimmo's analysis, the seeds consist of 64 per cent. of kernel, and 36 per cent. of shell, and the crushed cotyledons yield 27·5 per cent. of acrid oil, 32·5 per cent. of bland oil, and 40 per cent. of woody fibre, etc. The *croton oil* of the Pharmacopœia consists of the *bland oil* together with the *acrid matter*, which last contains free *crotonic acid*, *crotonates*, *resin*, and an alkaline principle called crotonin. *Crotonic acid*, when pure, is solid, volatile, having a pungent smell, and very acrid taste. It forms crystallizable salts with bases, and seems to give activity to the oil. Its composition is unknown. *Crotonin* discovered by Brandes is said to be crystalline and alkaline.

Adulteration.—The only oil with which it is likely to be adulterated is *castor oil;* but this, if present, may readily be detected by agitation with *alcohol*, which dissolves it out, and consequently lessens the entire bulk.

Operation.—Croton oil is a powerful local irritant, and a speedy cathartic. Rubbed upon the skin it acts as a rubefacient, and soon gives rise to an eruption of vesicles or pustules. Its purgative operation is drastic, and often accompanied by vomiting. The latter, however, is sometimes induced as soon as a drop of the oil is swallowed; and, when this is the case, the combination of a drop of creosote assists in its retention by the stomach. The stools which it gives rise to are watery. It acts upon the bowels, moreover, when rubbed upon the abdomen.

Uses.—This medicine effectually relieves the bowels in most of the obstinate forms of constipation, which have resisted the action of other energetic purgatives, and is to be preferred in apoplexy and paralysis from the quickness of its operation, and the powerful derivative action which it exerts upon the intestinal vessels. The smallness of the dose, also, peculiarly adapts it to these con-

ditions, as also to others in which the patient cannot or will not swallow, when a drop or two of this oil placed upon the tongue is perfectly adequate to the desired end. As a counter-irritant it is applicable to the same cases as tartar-emetic ointment.

Dose.—Gtt. j.—iij. It may be made into pills with bread crumb, or the compound extract of colocynth.

Ricinus Communis.—The Castor Oil Plant.

Monœcia, Monadelphia.

A perennial, sometimes arborescent, plant, having a round branched, and glaucous stem, of a purplish-red colour towards the top. Its leaves are peltato-palmate, with eight or ten lobes, and arranged alternately on the extremity of long, round footstalks, which have a large gland at their apex. The flowers grow in clusters upon a terminal spike, the lower ones being males, and the upper females. The capsule is prickly and tricoccous.

Hab.—Greece, Africa, and the East Indies. Cultivated in the South of Europe, the West Indies, and the United States.

Oleum Ricini. U. S. (*Oleum è seminibus expressum.*) *L.*

Description.—Castor oil is of a thick and viscid *consistence*, and has a very pale straw *colour*. It has little or no *odour*, and its *taste* is mawkish and sweetish.

Prep.—The seeds from which it is prepared are of an ovate form, and have a black shining husk, dotted with gray spots. There are two modes in which the oil is obtained, one with, and the other without the aid of heat. 1. The more common process is to steep the seeds for a night in cold water, and then to boil them for two hours, and, after drying, to bruise them and boil them again in this state with some fresh water, constantly stirring and removing the oil which rises to the surface. 2. A purer oil, and one which is much less liable to become rancid, is obtained without heat by decorticating the seeds, and after reducing them to a paste by grinding them in a mill, subjecting them to a strong pressure. This yields the finest cold-drawn castor oil.

Chem. Comp.—Castor oil seeds contain besides the *oil* of which we are about to speak, woody fibres, albumen, gum, etc. The seeds yield about 24 per cent. of envelope, which does not yield any oil. Castor oil consists of two oily substances, which can be separated by saponification, and treating the soap with an acid. Two acids are thus procured, one called *margaritic*, the other *ricinic acid*, the former being a solid, and the latter a liquid at ordinary temperatures; they are combined in the oil with *glycerine*. The compound differs from ordinary margarine and oleine, by the action of peroxide of nitrogen or sulphurous acid, by which castor oil is converted into *palmine*, a fatty crystallizable body.

Chem. Rel.—Castor oil differs from other fixed oils, in being *soluble in alcohol*, a peculiarity which can be used to detect its adulterations. When heated to destruction, it yields acroline, some fatty acids of which little is known, and an oil soluble in alkalies.

Adulteration.—The presence of any *other fixed oil* is at once perceived by agitation with *alcohol*, when the castor oil is taken up, and the impurity left undissolved.

Operation.—Castor oil is a valuable, effectual, and speedy cathartic. It produces thin and feculent stools, in which the oil may for the most part be recognised, and rarely occasions griping or irritation. Sometimes, however, nausea and vomiting are induced as soon as it is swallowed; but when this occurs, the patient may mostly be enabled to retain the dose by administering it floated upon some peppermint water. It possesses an important advantage as an habitual purgative, which is that instead of its being requisite to increase the dose as with the greater number of medicines, it may, on the contrary, be very much lessened, so that after its use for some time, half a tea-spoonful will occasion the same action upon the bowels as it had previously required half an ounce to produce.

Uses.—Its mild operation peculiarly adapts castor oil for the use of children and *delicate persons*, as well as to those cases in which the intestinal mucous membrane manifests a tendency to inflammatory action. Accordingly, it is the proper medicine to administer in *gastritis*, *enteritis*, and *dysentery*, when it is considered necessary to evacuate the canal by a purgative. In the slighter forms of these diseases, passing under the denomination

of inflammatory gastric or duodenal dyspepsia, and diarrhœa, castor oil, in doses of a tea-spoonful, not only proves effectual in most cases in clearing the bowels, but, according to Dr. Todd, has a soothing and quieting effect, and is often most useful in this way where it has no aperient action. (Art. *Indigestion*. Cyc. Pract. Med.) It is also well adapted for use, when any *irritation* exists *about the pelvic or urinary organs* as well as for pregnant and puerperal women, and after *operations* on the abdominal and perinæal parietes. After a dose of calomel with opium or belladonna, it is the best cathartic which can be administered in *colic*. It is also introduced into cathartic enemata.

Euphorbia Officinarum.—The Officinal Euphorbia.

Monœcia, Monandria.

[A succulent plant, of large size, with angular, channelled branches, armed with double, straight, spreading, dark, shining spines. Fruit three-celled, each containing one seed.]

Hab.—Africa.

Euphorbium (*Gummi-resina.*) *L.*

Description.—It occurs in the *form* of hollow tears, pierced with one or two holes, of a grayish-yellow *colour*, and a light brittle and friable *consistence*. It has no odour, and the *taste*, though slight at first, is afterwards acrid and burning.

How obtained.—Incisions are made in the branches of the plant, and the milky juice which exudes dries in the sun and constitutes euphorbium.

Chem. Comp.—Its principal constituent is a *resin*, which forms about 50 per cent. of the mass; besides which it contains *wax*, malates, sulphates, and phosphates of lime, woody fibre, etc.—The *resin* is of a reddish-brown colour, brittle, and very acrid. When heated it melts and carbonizes. It is very soluble in alcohol, but only slightly so in alkalies. It can be resolved into three distinct acids, called resin alpha, resin beta, and resin gamma, a property common to many other resins.

Oper. and Uses.—Euphorbium is a powerful irritant, inflaming

and vesicating the skin; and, if snuffed into the nostrils, acting most energetically as an errhine. Taken internally, it operates as an emetic and drastic purgative. It is only employed as an errhine mixed with some inert powder, and that very rarely.

PIPERACEÆ.

Piper Nigrum.—The Black Pepper.

Diandria, Trigynia.

[A shrub, with a climbing, rooting, terete, jointed stem. Leaves, ovate or elliptical, acuminate, coriaceous, smooth. Flowers in spadices, which are pedunculate and pendulous. Fruit, distinct, at first green, then red, and afterwards black.]

Hab.—The East and West Indies, where it is abundantly cultivated.

Piper Nigrum. U. S. (*Baccæ.*) *L.*

Description.—*Form,* rounded and wrinkled externally, about the *size* of a large pea, of a brownish-black *colour,* peculiar aromatic *odour* and a fiery bitterish *taste.*

Collection.—The berries are collected while red, and before they are quite ripe; they are dried in the sun, and becoming shrivelled constitute black pepper.

Chem. Comp.—They contain a *volatile oil,* an acrid *resin,* and a crystallizable neutral principle called *piperine,* besides gum, starch, mucilage, woody fibre, etc.—The *volatile oil* is lighter than water, colourless when pure, possessing in a high degree the odour and taste of the pepper, and has the same composition as the oil of copaiba, its *formula* being some multiple of $C^5 H^4$. —*Piperine,* a crystallizable neutral principle, occurring when pure in rhomboidal prisms, colourless, tasteless, and inodorous. The acridity of the impure crystals depends on the resin attached to them. It is fusible, but not volatile, very insoluble in water, but soluble in alcohol. When dissolved in cold sulphuric acid, it communicates a deep red colour to the acid. It forms a precipitate with chloride of platinum. Its *formula* is $C^{34} H^{19} NO^6$.

The resin is very acrid, and is probably formed by the oxidation of the oil.

Oper. and Uses.—Black Pepper is, like capsicum, a local irritant, occasioning a sense of warmth at the epigastrium, as well as in the mouth and throat, when chewed. Taken with the food, it assists the digestive process, and subsequently to its stimulant operation upon the stomach, excites the circulation generally and promotes diaphoresis. In some degree, it appears to exert the same influence over the mucous membrane as cubebs. It is also reputed antiperiodic, having been used as a remedy for *intermittent fever.* Its local stimulant action is availed of, in *relaxation of the uvula;* and, when taken in the form of confection, is serviceably exerted upon the rectum in *chronic hæmorrhoidal affections.* It has been substituted for cubebs in the cure of *gonorrhœa.*

Dose.—Grs. v.—xv.

Off. Prep.—*Confectio Piperis Nigri. L.* (Black pepper, elecampane, each, ℔j., fennel-seed, ℔iij., and sugar, ℔ij., are powdered and mixed together, and when the confection is required for use, it is readily prepared by the addition of honey, ℔ij.) *Dose,* ʒj.—iij.

Piper Longum.—Long Pepper.

Diandria, Trigynia.

[A shrubby, climbing plant, with the lower leaves ovate-cordate, and the upper, oblong, accuminate, oblique, coriaceous, smooth. Spadices, almost cylindrical.]

Hab.—The East Indies. Extensively cultivated in Bengal.

Piper Longum. (*Fructus immaturus exsiccatus.*) L.

Description.—*Form,* cylindrical spikes about an inch and a half long, and covered with little eminences arranged in spiral rows. *Colour,* grayish-brown. *Odour,* aromatic. *Taste,* intensely fiery.

Chem. Comp.—It contains similar principles to the preceding. The *volatile oil* has a different odour.

Oper. and Uses.—Its action on the system is similar to the

black pepper. It enters into the composition of the *confectio opii*, the *pulv. cretæ comp.*, *pulv. cinnamomi comp.*, and *tinct. cinnamomi comp.*

Piper Cubeba.—The Cubeb Pepper.

Diandria, Trigynia.

[A shrubby, climbing plant, with oblong or ovate-oblong, acuminate leaves, rounded or oblique at base, coriaceous and smooth. Berries with an elongated peduncle.]

Hab.—Java and the islands of the Indian Ocean.

Piper Cubeba. (*Baccæ.*) L.

Cubeba. U. S.

Description.—*Form*, globular, having the surface rough, and being furnished with a stalk two or three lines in length. They are of a grayish *colour*, being much lighter than black pepper, with which they might be confounded. *Odour*, aromatic. *Taste*, hot, bitterish, and camphoraceous.

Chem. Comp.—The composition of cubebs is very analogous to that of other peppers. It contains a *volatile oil*, a *resin*, a neutral principle, *cubebine*, together with *extractive matter*, gum, salts, etc.—*Volatile oil*, when pure, is slightly coloured, having an aromatic odour and taste somewhat similar to camphor; its composition is very like that of copaiba, being a multiple of ($C^5 H^4$) and forming a compound with hydro-chloric acid, having the *formula*, $C^{15} H^{12}$, H Cl. The *resin*, is very similar to that from copaiba.—*Cubebine*, a neutral crystallizable principle, which is probably identical with piperine, but it requires further investigation.

Oper. and Uses.—Cubebs are stimulant and carminative, and exert a specific influence over the mucous membranes generally, and especially over those of the bladder and urethra, arresting excessive secretion from them. Hence it is that they are commonly had recourse to for the cure of *gonorrhœa*, their administration being guided by the same rules as that of copaiba, with which they are mostly combined. They have also been benefi-

cially employed in *leucorrhœa* and in abscess of the prostate gland. We have found them effectual in lessening the quantity of pus discharged by the urine in *chronic pyelitis*.

Dose.—To cure gonorrhœa, ℥ß.—iij. For other purposes, grs. x.—℈ss.

Off. Prep.—*Tinctura Cubebæ. L.* (Bruised cubebs, ℥v., macerated in proof spirit, Oij.) *Dose*, fℨj.—iij.

Piper Angustifolium.—Matico.

Some doubt has been thrown upon the above botanical reference of *matico*, which, having long been used in Peru as a native remedy for hæmorrhages, has lately been introduced into British practice, and promises to maintain in this country the reputation it has enjoyed in South America as a most powerful styptic. Dr. Hodges states (*Proceedings of the Chemical Society*) that one sample which he has received consisted of the dried leaves of the plant, while another which he lately procured had, mixed with the leaves, a considerable quantity of the flowering twigs and woody stems of the plant, compressed together and flattened into a cake. The leaves have a strong aromatic slightly astringent *taste*, and the smell and taste of their infusion in water very much resembles that of the tea prepared by the country people in Ireland from the leaves of our indigenous *Salvia verbenaca.*

Chem. Comp.—The early analysis made by Mr. Clay of Liverpool, led to the belief that it contained *gallic acid* in its composition; but, from some experiments of Dr. Hodges, he concludes that, besides the ordinary constituents of leaves, it contains a soft dark-green *resin*, some aromatic *volatile oil*, and a bitter principle to which the name of *maticine* has been given. Its infusion throws down a dark olive-green precipitate with the persalts of iron.

Oper. and Uses.—Its therapeutical action is astringent, and this, whether it be employed as an external application or administered internally like other remedies of the class. When its use was first commenced in this country, by Dr. Jeffreys, it was found that it possessed the power of controlling obstinate *accidental hæmorrhages*, such as arose from leech-bites, the re-

moval of nævi, incisions, etc., when the under side of the leaf was applied to the bleeding surface. Since then, it has, in various hands, proved highly useful as an internal remedy for spontaneous hæmorrhages, being fitted for the same cases as are benefited by gallic acid, such, especially, as *menorrhagia*, *hæmaturia*, etc. The freshly powdered leaves should be used for internal administration, mixed with some thick vehicle.

Dose.—ʒj.—ij. An infusion made with cold water may be used, but decoction dissipates the volatile oil, and is hence an objectionable form.

URTICACEÆ.

Humulus Lupulus.—The Hop.

Diœcia, Pentandria.

A well-known climbing plant with a long, weak, and scabrous stem, leaves cordate and serrated, and 3 to 5-lobed. The flowers are diœcious, the females being arranged in a lax membranous cone, consisting of persistent bracts, having a single flower in the axilla of each.

Hab.—Continent of Europe. Extensively cultivated in this country.

Lupulus (*Strobili exsiccati.*) *L.*

Humulus. U. S.

Description.—Hops are the dried strobili or female catkins of the plant. They are met with in the *form* of imbricated scales, enclosing hard nuts, which are each surrounded by a yellow aromatic powder, consisting of globose grains (*lupulin.*) The *odour* is aromatic and peculiar, and the *taste* aromatic and bitter.

The aroma entirely depends upon the *lupulinic grains*, which constitute a sixth part of the dried hops.

Chem. Comp.—Both the lupuline grains and the cones deprived of the powder have been analysed.

The *grains* yield 65 per cent. to alcohol, and consist of a *volatile oil, resin*, a bitter principle called *lupulite*, also *tannin*, fatty and azotized extractive matters, gum, lignin, and salts.

The *scales* contain principles similar to the grains, but in different proportions; they yield to alcohol only 26 per cent. of their weight.—The *volatile oil*, constituting about 2 per cent., is lighter than water, contains sulphur, and gives the odour to hops. —*Resin* produced, probably, from the volatile oil by oxidation, constitutes about 52 per cent., of a yellow colour, having an aromatic odour and taste.

Lupulite.—A very bitter uncrystallizable yellow matter, having the flavour of the hop, not very soluble in water, but soluble in alcohol, neither acid nor alkaline in its reactions; it does not contain nitrogen.

Chem. Rel.—An infusion of hops exhibits reactions, depending on the presence of tannic acid, blackening *persalts of iron*, etc. It also contains sulphate of lime, and hence *oxalate of ammonia* and *chloride of barium* cause slight precipitates in it.

Oper. and Uses.—Hop is an aromatic tonic, being also, in a slight degree, narcotic, and, although not commonly prescribed alone, is a good addition to tonic and sedative mixtures. A pillow of hops has been occasionally used, in order to induce sleep in the irritable watchfulness of insane patients.

Off. Preps.—*Infusum Lupuli. L. Infusum Humuli. U. S.* (Hops, ʒvj. [ʒss. U. S.] macerated in boiling water, Oj.) *Dose*, fʒj.—ij.

Tinctura Lupuli. L. Tinc. Humuli. U. S. (Hops, ʒvj. [ʒv. U. S.] macerated in proof spirit, Oij.) *Dose*, fʒss.—ij.

Extractum Lupuli. L. (Prep. as ext. gentianæ.) *Dose*, grs. v.—ϑj.

Cannabis Indica.—The Indian Hemp.

Pentandria, Digynia.

The general opinion of botanists is, that the Indian hemp plant is identical with the species well known in Europe as the C. sativa, only a few minor differences existing between the female plants.

Hab.—India and Asia Minor.

Cannabis Indica.

Indian hemp abounds in resin, which, at the period of flowering, exudes from the leaves, stem, and flowers. In Nepaul, this resin is more or less carefully collected, and is known under the term *churrus*. The entire plant, with the resin still adhering, is collected after it has flowered, and being dried and made into bundles of twenty-four plants each, is known as *gunjah;* these bundles are about 2 feet in length and 3 inches in diameter. The plants are of a dusky-green colour, and have a resinous and adhesive feel. The larger leaves and capsules pass under the name of *bang*, *subjee*, or *sidhee*.

Chem. Comp.—Besides extractive matters, gum, salts, etc., gunjah contains a *volatile oil* and a *resin*, on which its active properties manifestly depend.

Operation.—This plant, which was introduced into European practice about six years ago by Dr. O'Shaughnessy, has long been in use in the East, prepared in a variety of ways, as a means of producing intoxication, or mixed with spices and aromatics as an aphrodisiac. Since then, its powers have been extensively tested; and it is now generally admitted as a remedy of great utility, and one whose applications we may expect to be still further extended. Its operation is distinctly narcotic and anti-spasmodic, the latter probably by a specific sedative influence which it exerts upon the excito-motory centre. In full doses, it occasions an agreeable (?) kind of intoxication, with delirium; patients who have experienced these sensations sometimes describing them by the term of "feeling wild." It has a distinct tendency also to produce sleep, which has been occasionally accompanied by a cataleptic condition. Where the dose is large, we have observed the urine acquire an odour something like that evolved when the tincture is mixed with water, and in part like that of the Tonquin bean.

Uses.—Its principal application has been for the relief of certain painful and spasmodic affections, where the use of so powerful a sedative is called for. *Chronic rheumatism* and *neuralgia*, as well as that obstinate affection *sciatica*, have been subjected with success to its remedial action; but, for their cure, it would

appear that the full operation of this drug is requisite to be produced. Pertussis and other *convulsive coughs*, as well as *asthma*, naturally present themselves to the mind as cases likely to derive benefit from its employment. *Tetanus* and *hydrophobia*, however, must be the touchstone of remedies claiming extraordinary sedative properties, and, accordingly, the Indian hemp has been freely employed in these diseases since its introduction into this country. It is no easy matter to determine the claims which a medicine holds forth, as controlling the former of these diseases; and we should be cautious of advancing statements in reference to the subjugation of such formidable foes, except on the most unexceptionable evidence. Tetanus has been occasionally recovered from, under a variety of treatment; and hence the disappearance of it in a few cases during treatment by this drug, must not rashly be used as a decided evidence of its curative capabilities. Of two cases lately treated with it in University College Hospital, one died, and the other recovered; the former was traumatic, the latter idiopathic. However, it is difficult to say how far it influenced the favourable termination; inasmuch as full and repeated blood-letting and colchicum were also employed.

Off. Prep.—*Extractum Cannabis Alcoholicum*, commonly known as the *resinous extract*, is prepared by boiling the gunjah in rectified spirit, and evaporating the solution by a water bath. All that is soluble in alcohol is thus taken up, and the extract consists chiefly of the resin mixed with colouring matters. It is of a greenish-brown colour, with a slightly bitter and nauseous taste, and a somewhat corresponding odour. It is commonly administered in doses commencing with gr. $\frac{1}{4}$, and gradually raised till some of its characteristic effects become apparent. The extract at first used in this country was prepared from some old gunjah; and it was then administered in doses of 8 to 12 grs.; but practitioners were not long in discovering that they must be more cautious in the administration of that made from the recent herb. It is either exhibited in the form of pills or dissolved in rectified spirit as a *tincture*. The resin is precipitated, as usual with such solutions, on mixing with water. The usual strength of the tincture is 3 grs. of extract to f℥j. of spirit, of which ♏v.—x. is the dose to begin with.

Dorstenia Contrajerva.—Contrajerva.

Tetrandria, Monogynia.

[A monœcious dwarf caulescent plant, with the stem covered with green, spreading, scaly stipules. Leaves palmate, the lobes lanceolate, acuminate, coarsely serrate, incised, almost pinnatifid. Flowers on a fleshy, flat, somewhat square, receptacle terminating a long, quadrangular stalk.]

Hab.—Mexico, Tobago, etc. The contrajerva of commerce is also afforded by the D. *Brasiliensis*, a native of Brazil.

Contrajerva. U. S. (*Radix.*) *L.*

Description.—*Form*, an oblong rhizome, terminating in one or several long curved root-fibres, and giving rise to numerous slender fibres also. *Colour*, reddish-brown externally, but paler within. *Odour*, aromatic. *Taste*, aromatic, bitterish, and acrid.

Oper. and Uses.—It is stimulant and tonic: rarely, if ever, prescribed at present.

Dose.—℈j.—ʒss.

Ficus Carica.—The Common Fig.

Polygamia, Diœcia.

A small tree, with smooth spreading branches, and cordate-palmate leaves, which are rough on the upper, but downy on the under surface. The flowers are enclosed within a pear-shaped fleshy receptacle, which is nearly closed at the apex. The fruit is this same receptacle become more pulpy and saccharine.

Hab.—Asia, and the south of Europe.

Fici (*Fructus siccus*). *L.*

Ficus. U. S.

The dried figs are too well known to require further description. They abound in a viscid saccharine pulp.

Oper. and Uses.—They are nutritive and laxative. They enter into the composition of the *decoctum hordei comp.* and *confectio sennæ.*

Morus Nigra.—The Common Mulberry.

Monœcia, Tetrandria.

A well-known tree, with rough cordate and serrated leaves. Its flowers are monœcious; and the fruit consists of the females, grown together and become succulent.

Hab.—Persia. Cultivated. [In this country the fruit of the native species *M. rubra* supplies the place of the foreign.]

Mora (*Fructus*). *L.*

Mulberries are an agreeable fruit, which, like other acidulous fruits, may be allowed in moderation to patients in fever. They are retained in the Pharmacopœia for the sake of their colouring matter.

Off. Prep.—*Syrupus Mori. L.* (Mulberry juice, Oij., made into a syrup with sugar, ℔ijss.) A colouring ingredient for mixtures.

ULMACEÆ.

Ulmus Campestris.—The Common Elm.

Pentandria, Digynia.

A large tree, with rough ovate doubly-serrated leaves. Its flowers appear before the leaves, and grow on short spikes, at the bottom of the leaf-buds.

Hab.—Southern parts of England, in France, &c.

Ulmus (*Cortex.*) *L.*

Description.—The inner bark, or liber, is the officinal part. It occurs in the *form* of thin tough pieces, of a brownish-yellow *colour,* and bitter mucilaginous *taste.*

Chem. Comp.—Elm bark contains a large quantity of *mucilage*, together with *tannic acid*, 2·7 per cent., and a little *resin*, salts, woody fibre, etc. The exudations frequently found on the bark, when altered by exposure to the air, consist chiefly of a substance called *ulmine* or *ulmic acid*. This substance can also be produced artificially.

Chem. Rel.—A decoction or infusion of elm bark strikes a bluish-green colour with the salts of iron; and precipitates a solution of gelatine, in consequence of the tannic acid it contains.

Oper. and Uses.—Elm bark is tonic and astringent, but rarely used. Dr. A. T. Thomson says, "I have long prescribed it instead of sarsaparilla."

Off. Preps.—*Decoctum Ulmi*. (Bruised elm bark, ℥ijss., boiled down with water, Oij.) *Dose*, f℥iv.—vj.

[Ulmus Fulva.—Slippery Elm.

A lofty native tree, with brown, rough bark, and oblong, ovate, acuminate, pubescent, rough leaves. The flowers, which appear before the leaves, are in clusters at the end of the branches. They are tomentose and apetalous. The stamens are short and of a reddish colour. The fruit is a membranaceous capsule, winged, and enclosing a single round seed.

Hab.—In the United States to the north of Carolinas.

Ulmus. U. S. (*Liber.*)

Description.—Long, nearly flat, fibrous pieces, colour, on the outside tawny, on the inner reddish. *Taste*, sweetish, mucilaginous. *Odour*, slight.

Chem. Comp.—No correct analysis has been made of this bark, but it is known that it abounds in *mucilage*, in combination with some tannic acid, etc.

Oper. and Uses.—The slippery elm is an excellent demulcent, and is applicable to every case in which such remedies are required. It has been found useful in chronic skin diseases, and has also been recommended for bougies, tents, and catheters, especially where it is wished to dilate a part. It is used inter-

nally, in the form of infusion, and also in the form of poultice, externally, by mixing the powdered bark with warm water.

Off. Prep.—*Infusum Ulmi. U. S.* Slippery elm bark, ℨj.; boiling water, Oj., macerate and strain.]

CORYLACEÆ.

Quercus Pedunculata.—The Common British Oak.

Monœcia, Polyandria.

A large handsome tree, with bright-green oblong-ovate leaves, deeply sinuous and sessile. It is further known from other oaks by the acorns being arranged two or three upon a long peduncle.

Hab.—Most parts of Europe.

Quercus (*Cortex.*) *L.*

Description.—The oak bark is peeled from the smaller branches for medicinal use. It is met with in the *form* of long pieces, having a grayish shining epidermis, and being of a pale cinnamon or fawn *colour* on the inner surface. In *consistence*, it is brittle and fibrous, and it possesses an astringent *taste.*

Chem. Comp.—The ingredients which render oak-bark useful as a medicine, are the *tannic* and *gallic acids,* which it contains in large quantities; besides which, we find a large quantity of *pectic acid*, with the ordinary constituents of barks.

Chem. Rel.—The reactions exhibited by a decoction of oak-bark, are those of a solution of tannic acid.

Oper. and Uses.—Its action on the system is astringent, and, though rarely administered internally, it is a most valuable agent where a remedy of this nature is required for local application. In that very common form of *leucorrhœa,* which is connected with an atonic condition of the system, where the discharge is exceedingly abundant and keeps up a constant anæmia, we know of few remedies more useful than the decoction of oak-bark employed with alum as an injection. The decoction is employed also as a gargle in *relaxed sore throat*, and as an enema in the latter stage of *dysentery.*

Off. Prep.—*Decoctum Quercûs. L.* (Bruised oak-bark, ℥x., boiled down with water, Oij.)

Quercus Infectoria.—The Gall-Oak.

Monœcia, Polyandria.

A small tree or shrub, with a crooked stem, bearing ovate-oblong and sinuate leaves upon short petioles. The fruit is sessile and very long.

Hab.—Asia Minor.

Gallæ. U.S. (*Gemmæ morbidæ.*) *L.*

Description.—Nut-galls are a morbid production of this plant, due to the perforation of the young twigs by a hymenopterous insect—the *Cynips gallæ tinctoriæ.* The eggs of the insect are deposited within the wounds thus made, and the excrescences form around them. When the young insect has passed through all its changes, and not till then, it perforates the gall in the form of the imago and escapes. The gall has a globular *form*, studded with tuberosities upon the surface, and varies in *size* up to that of a hazel-nut. It has a blackish-blue *colour*, a heavy brittle *consistence*, and very astringent *taste.* The best are the heaviest and unperforated. The pale and light-coloured are of inferior quality. *Aleppo* galls are most esteemed.

Chem. Comp.—Gall-nuts contain a very large quantity of *tannic acid*, about 35 per cent.; about 5 per cent. of *gallic acid*, as well as *ellagic acid* with *extractive matter*, salts and lignin.

Tannic Acid.—It occurs in all species of quercus as well as in very many other plants. It is contained in largest quantity in gall-nuts, from whence it is procured by a process of percolation with ether. When pure, it occurs as a pale yellow powder, very soluble in water. Its solution reddens litmus paper, and has a very astringent taste.—*Formula*, $3\,HO + C^{18}H^{5}O^{9}$.—It combines with the skins of animals and forms leather; and by this means can be removed from any solution containing it. It unites also with *gelatine* in solution, forming a curdy precipitate called tanno-

gelatine; it likewise precipitates *starch*, *albumen*, and many of the *metallic oxides*; with the *persalts of iron* it forms a dark blue precipitate ($F^2 O^3, C^{18} H^5 O^9 + 9 HO$) the basis of writing ink: it causes no alteration in a solution of a pure protosalt of iron. It precipitates *tartar emetic*, and also most of the *alkaloids* and *neutral vegetable principles*, as quina, theine, etc. (See Appendix.)

Gallic Acid.—An acid contained in nut-galls and in some other plants. It is doubtful whether it exists as such in the plant, or is produced during the drying from the decomposition of tannic acid. It is prepared, by boiling for a few minutes a mixture of tannic acid and sulphuric acids, or by exposing a solution of nut-galls to the air for some time, when oxygen is absorbed and carbonic acid evolved; the decomposition may be expressed as follows:

1 eq. of tannic acid, $C^{18} H^4 O^{12}$, and 8 eqs. of oxygen, $O^8 =$ 2 eqs. of hydrated gallic acid, $C^7 H^4 O^6$, and 4 eqs. of carbonic acid, $4\, CO^2$.

Its *formula* is $2\, HO, C^7 HO^3 + HO$.—It occurs when pure in thin silky needles, not very soluble in cold water, but only requiring 3 parts of boiling water for their solution; soluble in alcohol. It is distinguished from tannic acid by *not* precipitating a solution of *gelatine* or the *alkaloids*, while it produces a bluish-black precipitate with *persalts of iron*. Gallic acid is easily decomposed in contact with air; when heated it forms two other acids, called *pyrogallic* acid and *metagallic* acid.

Ellagic acid is formed along with gallic acid in the process for making the latter. It occurs as a white powder, insoluble in water, but soluble in alkalies, from which acids precipitate it. Its *formula* is $C^7H^3O^5$. *Nitric acid* first colours it blood-red, and afterwards converts it into oxalic acid. Its composition is the same as that of gallic acid dried at 212°. (See Appendix.)

Chem. Rel.—The same as those of *tannic acid*.

Oper. and Uses.—Galls are powerfully astringent, and, although not administered internally so often as gallic acid, prove serviceable in similar cases, exercising a powerful influence over *asthenic fluxes and hæmorrhages*. Their principal employment, however, is as topical astringents, being used in gargles for the relief of a *relaxed uvula*, as an injection in *leucorrhœa*, or mixed with opium and lard as an ointment for the cure of *piles*. Galls

are an antidote for poisoning by tartar emetic, or the vegeto-alkalies.

Dose.—Grs. x.—xx.

Off. Preps.—*Tinctura Gallæ. L. U. S.* (Powdered galls, ℥v., [iv., U. S.,] macerated in proof spirit, Oij., and strained.) *Dose*, f ʒss.—ij.

Unguentum Gallæ Compositum. L. (Very finely powdered galls, ʒij., mixed with powdered opium, ʒss., and lard, ℥ij.) A common application to chronic hæmorrhoids, when not suffering under any inflammatory aggravation.

[Quercus Tinctoria.—Black Oak.

Monœcia, Polyandria.

A native tree of large size, frequently eighty to ninety feet high. The trunk is covered with dark-coloured, deeply fissured, rugose bark. The leaves are oblong, ovate, somewhat sinuated with obtuse, oblong, mucronated lobes. The acorn is somewhat globose, flattened at top, and supported in a saucer-like cup.

Hab.—Most parts of the United States.

Quercus Tinctoria. U. S. (*Cortex.*)

Description.—*Form*, in powder or shreds, being the cellular portion reduced by being ground. *Colour*, brownish-yellow. *Odour* peculiar, somewhat aromatic. *Taste*, bitter and astringent.

Chem. Comp.—No exact analysis has been published of this bark; but it is known to contain a colouring principle, which is soluble in boiling water, which strikes a brownish-yellow colour by itself, and a variety of tints from olive to black with the preparations of iron. Large quantities of the ground bark are exported under the name of *Quercitron bark*. It also contains much tannin and gallic acid.

Oper. and Uses.—This bark is astringent and tonic. It is principally used in decoction, as an astringent in bowel complaints, and as a gargle in sore throat, and also externally as a lotion to gangrenous ulcers. The infusion from tanners' vats called ooze-water, is also useful in leucorrhœal and gonorrhœal

discharges in females. The bark of the white oak *Q. alba* is preferred for internal use, as it is less apt to irritate the bowels.

Dose.—Powder, grs. xxx.—ʒj.; decoction, f℥ij.

JUGLANDACEÆ.

Juglans Cinerea. Butternut.

A native tree, sometimes of considerable size, with numerous horizontal branches, and long, pinnate leaves, consisting of seven or eight pairs of sessile, acuminate, serrate leaflets, and a single terminal, petiolate one. The flowers are unisexual, both sexes on same tree. The fruit is an oblong, oval, hairy, viscid drupe, containing a dark, oblong, pointed nut, deeply furrowed.

Hab.—The northern, eastern, and western parts of the United States.

Juglans. U. S. (*Radicis Liber.*)

Description.—*Form*, pieces of various sizes, of a fibrous texture. *Colour*, at first white, which changes to yellow, and finally to a dark brown. *Odour*, feeble. *Taste*, bitter and somewhat acrid.

Chem. Comp.—It is stated that this bark contains *fixed oil, resin, saccharine matter, lime*, and *potassa*, a *peculiar principle soluble in water*, and *tannin*. This last was not found on an examination by Dr. Bigelow. (See *Carson's Pereira*, p. 762.)

Oper. and Uses.—Butternut is a mild cathartic, operating without pain, and causing very little irritation. It is well suited to cases of habitual costiveness, and has been found useful in dysentery; and, in combination with calomel, has been much employed in febrile affections. It is generally given in extract.

Off. Preps.—*Extractum Juglandis. U. S.* Made by displacement from the bark, in coarse powder, and evaporating to proper consistence. *Dose*, grs. x.—xxx.]

SALICACEÆ.

Salix.—Species of Willow yielding a medicinal bark.

Diœcia, Diandria.

There are several species of the genus salix growing in this country, (England,) whose bark has been used for medicinal purposes. The *S. Russelliana* is the most valuable, but the *S. fragilis*, *S. capræa*, and the *S. alba*, are those rendered officinal by the Dublin College.

Salix (*Cortex*). *D.*

Description.—The bark of the smaller branches is the officinal part; it has a bitter *taste*, with more or less astringency, according to the species from which it has been taken.

Chem. Comp.—Besides the ordinary constituents of barks, willow bark contains variable amounts of *salicine*, a neutral principle and *tannic acid*, to which it owes its therapeutical importance. The latter of these ingredients renders its infusion or decoction incompatible with ferruginous salts.

Oper. and Uses.—Similar to those of salicine, except that it possesses some astringency in addition, from the small quantity of tannic acid it contains.

Dose of the powdered bark, ʒss.—j. It is best exhibited in infusion or decoction.

Salicine.

A substance occurring in the *form* of scaly crystals, of a white *colour*, soluble in water and alcohol, but not in ether. The solutions are neutral in their reaction, and very bitter to the *taste*. Sulphuric acid strikes a blood-red colour with salicine, and on willow bark containing much of it. The *formula* for salicine has been stated to be $C^{48}H^{28}O^{22}$ (*C. Gerhardt*). It can be procured by boiling the willow bark in water, and digesting the decoction with oxide of lead, which removes the tannic acid, etc., and allows the salicine to crystallize on evaporation; it can be purified by re-solution, treating with animal charcoal, and re-crystallization.

Oper. and Uses.—The trial which the writers have given to this principle as a substitute for quina, authorizes them in expressing an opinion of its utter inefficiency as a tonic, when compared with the cinchona alkaloids. This might have been suspected, indeed, from the absence of any nitrogen in its composition. They have had no opportunity of testing its value in intermittent fever: as a simple bitter, however, it appears to rank with gentian, calumba, etc., its principal good effect being seen in the improved appetite which sometimes follows upon its use. *Dose*, grs. x.—xx.

CONIFERÆ.

Pinus.—Species yielding Turpentine, Tar, and Pitch.

Monœcia, Monadelphia.

Species of Pinus yielding the Turpentines, etc.

1. *Pinus Abies.* A lofty tree, with solitary tetragonal leaves, and cylindrical pendulous cones. *Hab.*—Norway, Russia, etc.	Yielding Abietis Resina and Pix Abietina.
2. *Pinus sylvestris.* A tall tree, with rigid glaucous leaves, arranged in pairs. The cones ovate, acute, and also generally in pairs. *Hab.*—Scotland, Norway, etc. *Pinus Pinaster.* A tree larger than the last, with very long, rigid leaves, arranged in pairs. The cones are large, sessile, and clustered, oblong, and obtuse in form, and with bristly scales. *Hab.*—Bordeaux. *Pinus palustris.* A very large tree, with very long leaves, arranged in threes. The cones are sub-cylindrical, and armed with sharp prickles. *Hab.*—United States.	Yielding Terebinthina vulgaris, Terebinthinæ oleum, Resina, Pix liquida, and Pix nigra.

3. *Pinus balsamea.* An elegant tree. with solitary, flat, and emarginate leaves. The scales of the flowering cones are acuminate and reflex. *Hab.*—North America.	Terebinthina Canadensis.

The above species yield three kinds of turpentine, which it will be advantageous to consider together, as well as other articles, either obtained from the trees themselves, or by a subsequent process from the turpentines.

Terebinthinæ.

Varieties.—1. *Abietis resina* (*Resina*,) *L.*, or frankincense.—*Form*, concrete tears. *Colour*, yellowish and opaque. *Consistence*, firm and brittle, but softening at the temperature of the body. *Odour*, slight. *Taste*, bitterish and acrid.

2. *Terebinthina vulgaris* (*Resina liquida*). *L.* The American turpentine, which is almost solely known by that name.—*Consistence*, semi-fluid, or a soft solid. *Colour*, a pale, dirty grayish-yellow, translucent or opaque. *Odour*, aromatic. *Taste*, pungent and bitter.

3. *Terebinthina Canadensis* (*Resina liquida*). *L. U. S.* Canada balsam.—*Consistence*, fluid, and slow to consolidate. *Colour*, slight or pale yellow and transparent. *Odour*, agreeable and terebinthinate. *Taste*, slightly bitter and acrid.

Chem. Comp. and Rel.—The turpentines all contain *volatile oil* and *resin* which are separable by distillation. They gradually solidify on exposure, and are soluble in fixed oils, alcohol, and ether. They are inflammable, and burn with a red and smoky flame.

Oper. and Uses.—They are rarely administered internally. They act as stimulants, especially affecting the mucous membranes, and in other respects resemble the ol. terebinthinæ.

Dose.—℈j.—ʒj., made into pills or an emulsion.

The Terebinthina vulgaris forms an ingredient of the *emplastrum galbani* and *unguentum elemi*. *Terebinthinæ oleum* and *resina* are prepared from it.—The Abietis resina forms an ingredient of *emplastrum galbani*, *emplastrum opii*, and *emplastrum picis*. *Pix abietina* is merely this purified.

Pix Abietina. (*Resina præparata.*) *L.*

Pix Abietis. U.S.

This is Abietis resina melted in hot water and strained through a coarse cloth. It has a hard and brittle consistence when cold, and possesses the form of the vessel in which it is kept; otherwise it resembles frankincense.

Oper. and Uses.—As *abietis resina.*

Off. Preps.—*Emplastrum Picis.*—(This consists of Burgundy pitch, ℔ij.; frankincense, ℔j.; resin, and wax, each, ℥iv., melted together, to which some water, olive oil, f℥ij., and oil of nutmeg, ℥j., are subsequently added.)

Terebinthinæ Oleum. U.S. (*Oleum è resinâ destillatum.*) *L.*

Description.—This is a well-known colourless limpid fluid, having a disagreeable and peculiar *odour*, and a bitter, acrid, and aromatic *taste.* It is prepared by the distillation of common turpentine with water; the oil comes over with the watery vapour and floats on the condensed liquid.

Chem. Comp.—Pure oil of turpentine is comp. 20 eqs. of *carbon* and 16 eqs. of *hydrogen;* its *formula* therefore is $C^{20} H^{16}$.

Chem. Rel.—Oil of turpentine has sp. gr. 0·872. It consists of two isomeric oils; for when it combines with hydrochloric acid gas, it forms two compounds, one solid, the other liquid, the first being called *artificial camphor.* Both compounds have the formula $C^{20} H^{16}$, HCl. The compound $C^{20} H^{16}$ has been called *camphene.* Oil of turpentine boils at 314° F. It is very combustible, and emits much smoke when burned in air, unless well supplied with oxygen by a peculiar contrivance, as in the *camphene lamp.* It is a solvent of many resins, etc. It absorbs oxygen when exposed to the air, and becomes converted into resin.

Operation.—Oil of turpentine is a topical stimulant and rubefacient. Taken in small doses it acts as a general excitant, elevating the temperature of the surface and increasing the rapidity of the pulse, an action which sometimes terminates in

sweating. Most commonly, however, it operates as a diuretic, the urine acquiring at the same time the odour of violets. It exerts also a special influence over the mucous membranes, especially those of the genito-urinary system, allaying hæmorrhage from them and lessening excessive secretion. Sometimes these small doses irritate the bladder and kidneys, giving rise to strangury and bloody urine. In a large dose, such as fʒß or fʒj., it proves pretty actively cathartic; but, although in this case not producing, for the most part, any irritation of the genito-urinary system, it sometimes occasions symptoms of intoxication. The latter unpleasant result may be obviated in a majority of instances, by the combination of a little castor oil.

Uses.—The two principal applications of oil of turpentine as a purgative are for the destruction and expulsion of the *tape-worm*, and for the removal of nervous symptoms in subjects known as *hysterical*. For the former purpose, we are acquainted with no remedy which is of equal value to this; and for the latter, its employment by mouth or in an enema is singularly beneficial; hysterical aphonia, convulsions, coma, etc., often yielding rapidly to its exhibition. In small doses it proves very serviceable in restraining *passive hæmorrhages*, especially from the intestinal canal, as well as various asthenic fluxes which occur from the bronchial or genito-urinary membrane. Either given by the mouth or thrown into the rectum, it proves highly useful in removing the *flatulent condition of the alimentary canal*, which is so distressing in fever, and which frequently constitutes one of the most annoying symptoms of hysterical patients. In the last place, oil of turpentine has been recommended, and used with benefit, by Mr. Hugh Carmichael of Dublin in *iritis*, and, in some forms of this affection, other observers have found it highly efficacious. As a rubefacient, it is employed either in the form of fomentations or liniment, in a variety of painful and *spasmodic affections* of the stomach and intestines, as well as in *chronic bronchitis*, *phthisis*, etc. It is frequently mixed with linimentum calcis, as an application to *burns and scalds*.

Dose.—As a purgative, f℥ß—jß., for other purposes, ♏x.—fʒj.

Off. Preps.—*Oleum Terebinthinæ Purificatum. L.* (This is merely a re-distillation of oil of turpentine with water.)

Enema Terebinthinæ. L. (Oil of turpentine, ℥j., suspended in

barley water, f℥xix., by the aid of yolk of egg.) Used as a purgative and anti-spasmodic enema in tympanites, etc.

Linimentum Terebinthinæ. L. U.S. (Oil of turpentine, f℥xvj., mixed with soft soap, ℥ij., and camphor, ℥j.) [Oil of turpentine, Oss.; resin cerate, ℔j., U.S.]

Resina. U.S. (*Residuum resinæ liquidæ postquam terebinthinæ oleum destillatum est.*) *L.*

Description.—*Consistence*, solid and brittle. Its *colour* is yellow and at the same time opaque, if the distillation have not been pushed too far; but if much of the water combined with it has been driven off, it is transparent. Should the distillation have been carried on till all the water is expelled, it becomes transparent and brown. It is the residue of the distillation of turpentine with water.

Chem. Comp.—Resin or colophony is composed of two isomeric bodies, *pinic* and *sylvic acids*, which have the *formula*, $C^{40}H^{30}O^{4}$. *Pinic acid* is distinguished from sylvic acid by its being soluble in cold *alcohol*, which medium does not dissolve sylvic acid.

Chem. Rel.—Common resin, or the mixture of these two acids, possesses the following properties. It possesses acid properties, and forms salts with *bases:* with the alkaline bases, the salts are soluble, and are much used in the manufacture of common yellow soap. It is soluble in *alcohol*, *ether*, and *fixed* and *volatile oils*. When heating, a new resin is formed, called *colophonic acid*, isomeric with the others; and this, still further heated, yields an oily compound, called *resinine* (comp. $C^{20}H^{15}O$): a still higher temperature gives other products, as *retinaphtha* ($C^{7}H^{4}$), *retinyle* ($C^{9}H^{6}$), and *retinole* ($C^{8}H^{4}$).

Oper. and Uses.—Merely employed as an ingredient of plasters and ointments.

Off. Preps.—*Ceratum Resinæ. L. U.S.* (Equal parts of resin and wax, ℔j. each, are melted together, and, after the addition of olive oil, f℥xvi., the whole is pressed through linen); a stimulant application, sometimes of use for *indolent ulcers*.

Emplastrum Resinæ. L. U.S. (Lead plaster melted and mixed with powdered resin.)

Pix Liquida. U. S. (*Resina præparata liquida.*) *L.*

Description.—Vegetable tar is met with as a viscid liquid, of a dark brown colour and peculiar odour.

Prep.—A hole being dug in the earth near a bank, billets of pine wood are piled up in it, and the whole covered in with turf. The wood is then lighted at the top, and during its slow combustion, the tar collects in an iron pan at the bottom, from which it runs by means of a pipe through the bank into barrels placed for its reception.

Commer. Source.—Chiefly Russia and North America.

Chem. Comp.—The composition of tar is very complex, consisting of *colophonic*, *acetic*, and other *resinous acids*, together with *oil of turpentine*, *creosote*, *eupion*, and other pyrogenous oils, crystallizable hydrocarburates, as *naphthaline*, *paranaphthaline*, paraffine, etc.

Oper. and Uses.—Tar is a topical stimulant, and when administered internally, operates much in the same way as turpentine. The inhalation of its vapour has been recommended for the excessive secretion of *chronic bronchitis* and *phthisis*; but its employment is of doubtful efficacy. Tar ointment is a very useful application to the chronic forms of *lepra* and *psoriasis*, and when there is no great activity in the local circulation, frequently proves effectual in their cure.

Off. Prep.—*Unguentum Picis Liquidæ. L. U. S.* (Tar and suet in equal parts melted together and pressed through linen.)

Pix Nigra (*Resina præparata solida.*) *L.*

Description.—This is the residue of the distillation of the last. It is a firm black solid, with a shining fracture. It is tar deprived of its volatile constituents.

Oper. and Uses.—It has been administered internally in *ichthyosis* and other skin-diseases, and also as an external remedy.

Off. Prep.—*Unguentum Picis Nigræ. L.* (Black pitch, wax, resin, each, ℥ix., and olive oil, f℥xvj., melted together, and the whole pressed through a cloth.)

Juniperus Communis.—The Common Juniper.

Diœcia, Monadelphia.

An indigenous, bushy shrub, with evergreen, spreading, linear leaves, tipped with a spine, and arranged three in a whorl. The flowers are diœcious and axillary. The fruit is a small cone composed of three fleshy scales, enclosing three bony nuts.

Juniperi Cacumina (*Juniperi fructus.*) *L.*

Juniperus. U. S.

Description of the Fruit.—Juniper berries, as they are commonly but incorrectly termed, have a rounded *form*, and are about the size of currants. They have a purplish-black *colour*, with a glaucous bloom. Their *taste* is sweetish and terebinthinate, and *odour*, agreeable and balsamic.

Commer. Source.—The greater part of the juniper berries in this country are imported from Italy.

Chem. Comp.—Juniper berries are composed of a *volatile oil*, a *resin*, and *sugar*, besides woody fibre, wax, salts, etc.—*Volatile oil:* it has the odour and taste of the berries, and consists of two isomeric oils. It has the comp. $C^{15}H^{12}$ or 3 (C^5H^4); for the crystalline compound formed with hydrochloric acid is represented by $C^{15}H^{12}$, H Cl.—*The resin* is probably produced by the oxidation of the volatile oil. The tops have a similar comp. to the berries.

Oper. and Uses.—Juniper is stimulant and diuretic, acting upon the urinary organs in a very similar manner to oil of turpentine, and, in large doses, giving rise to strangury and hæmaturia. It is, accordingly, employed to increase the secretion of the kidneys in *dropsy*, and to diminish *asthenic fluxes* from the mucous membranes, especially from the urethra.

Dose of the berries, ℈j.—ij.

Off. Preps.—*Oleum Juniperi. L.* (Prepared as oil of anise.) *Dose*, gtt. ij.—vj.

Spiritus Juniperi Compositus. L. (Bruised juniper berries, ℥xv., caraway and fennel, each, ℥ij., mixed with proof spirit, *cong.* j., and water, Oij., and distilled.) *Dose*, f℥ij.—iv.

JUNIPERUS SABINA.—The Common Savin.

Diœcia, Monadelphia.

This shrub is shorter than the last, the younger branches being closely invested by very small glandular leaves. The fruit is a small round cone, of a purplish colour.

Hab.—South of Europe, and Asiatic Russia.

SABINA. U. S. (*Cacumina recentia et exsiccata.*) *L.*

The tops are the officinal part of the plant. They have a strong, peculiar *odour* when bruised, and a nauseous, resinous, bitter *taste.*

CHEM. COMP.—The medicinal properties of savin depend on a *volatile oil,* having the odour of the plant, and an acrid, bitter taste. Its sp. gr. is less than water, and its *formula,* some multiple of C^5H^4. It is very similar in properties to the oil of juniper.

OPER. AND USES.—Savin is a topical irritant, rubefacient and vesicant, and has been recommended for internal use as an emmenagogue. There is reason to believe that its supposed power to produce abortion, leads much more commonly to its use by females than is generally imagined; but it is important to know, that it more frequently endangers the life of the mother, than destroys the product of conception. Its chief employment by the practitioner is, for the purpose of maintaining the discharge from a blistered surface, by dressing the latter with an ointment containing it.

DOSE of the powder, grs. v.—xv.

OFF. PREP.—*Ceratum Sabinæ. L. U. S.* (Lard, ℔ij., is melted with wax, ℔ß, and bruised savin, ℔j., being added, the whole is expressed through linen.) (Savin, in powder, ℥ij.; resin cerate, ℔j. U. S.)

ZINGIBERACEÆ.

ZINGIBER OFFICINALIS.—The Officinal Ginger.

Monandria, Monogynia.

The plant consists of a biennial rhizome, giving origin to her-

baceous stems about three feet in height, enveloped by alternate sheaths which support the pointed and lanceolate leaves. Its flowering stems arise independently of those which bear the leaves, are much shorter, are also enveloped in sheaths, and terminate each in an oval, obtuse, and short spike, consisting of imbricated bracts, between which the flowers appear.

Hab.—Cultivated in the East and West Indies.

Zingiber. U.S. (*Rhizoma.*) *L.*

Description.—There are two varieties of ginger, known under the names of *white* and *black* ginger.—White ginger occurs in the *form* of flattish, long, lobed, and more or less knotted pieces. *Colour*, externally, very pale; internally, a pale buff. Its *texture* is rather tough, and *fracture* rather short and fibrous. *Odour*, peculiar and pungent. *Taste*, hot, aromatic, and peculiar.—Black ginger is met with in *shorter pieces*, covered with a *dirty gray cuticle*, and having a horny *fracture.*

Prep.—After the herb has withered at the close of the year, and when the rhizomes are about a twelvemonth old, they are gathered and prepared for exportation; and it is upon the modification of this process, that the difference of white and black ginger is said to depend. When it is merely scalded and dried, the latter is constituted; but when each rhizome is separately washed, scraped, and peeled before drying, it forms the white kind, which is most esteemed. It has, however, been supposed that they are derived from different plants.

Commer. Source.—East and West Indies, chiefly the latter.

Chem. Comp.—The medicinal virtues of ginger are owing to a *volatile oil*, of which it contains 1·5 per cent., and a soft *aromatic resin* about 3·5 per cent.; besides which the rhizome contains gum, starch, extractive matter, woody fibre, salts, etc.

Oper. and Uses.—A topical and general stimulant, and, when chewed, increases the salivary flow and the secretion of buccal mucus. It is used internally, as a carminative in *flatulence*, and is often combined with active cathartics, with the view of correcting their griping operation. It is serviceable, as a condiment, for some persons who suffer under *atonic dyspepsia.* It may be

used in a moistened state, applied to the skin, as a counter-irritant.

Dose.—Grs. v.—℈j.

Off. Prep.—*Tinctura Zingiberis. L. U.S.* (Sliced ginger, ℥ijss., macerated in rectified spirit, Oij.) *Dose,* fℨß—ij.

Syrupus Zingiberis. L. U.S. (Ginger, ℥ijss., is steeped in boiling water, Oj., and the infusion made into a syrup with sugar, ℔ijss.) *Dose,* fℨj.—ij.

[The U. S. directs Tinc. Zingiberis, f℥iv., (prepared with ginger, ℥viij., and Oij., alcohol) to a gallon of syrup, and to draw off alcohol by a water bath.]

Elettaria Cardamomum.—The Officinal Cardamom.

Monandria, Monogynia.

[This plant has a rhizome with numerous fleshy fibres, and erect, smooth, jointed stems. The leaves are subsessile, lanceolate, pubescent above, silky beneath, sheathed at base. Scapes several, bearing lax spikes of pale greenish flowers, marked with purplish stripes. The capsule is oval, somewhat three-sided, three-celled, three-valved, many-seeded.]

Hab.—Malabar, where it is cultivated, especially in the Wynaad.

Cardamomum. U.S. (*Semina.*) *L.*

Description.—The seeds are trapezoidal and rough, of a dark brown *colour*, a camphoraceous *odour*, and aromatic warm *taste.* They are imported, and should be preserved, in their capsules, in which they are very closely packed. These are ovate-oblong, bluntly triangular, and of a grayish colour, varying in length from three to six lines to nearly an inch. The smallest are most esteemed, and are known as *shorts.* The longest pass under the designation of *longs,* and the intermediate size under that of *short-longs.*

Chem. Comp.—The activity of these seeds depends on a *volatile oil,* of which they contain 4·5 per cent.: it is colourless, of an aromatic odour, and lighter than water; they contain besides a

fixed oil, starch, mucilage, extractive and colouring matters, woody fibres, and salts.

Oper. and Uses.—Aromatic and carminative; employed as an adjunct to other medicines.

Dose.—Grs. v.—xx.

Off. Prep.—*Tinctura Cardamomi. L. U.S.* (Bruised Cardamoms, ℥iijss., [℥ivss., U.S.], macerated in proof spirit, Oij.) *Dose*, f℥j.—ij.

Tinctura Cardamomi Composita. L. (Bruised cardamom and caraway seeds, each, ʒijss., cochineal, ʒj., and cinnamon, ʒv., with raisins, ℥v., macerated in proof spirit, Oij.) *Dose*, fʒj.—ij. Often used as a colouring, or stomachic ingredient of tonic mixtures.

Curcuma Longa.—The Turmeric Plant.

Monandria, Monogynia.

This plant has a perennial rhizome, with numerous ramifications, both of a yellow colour; and this gives rise to broad lanceolate leaves, seated upon long sheathing petioles. The flower-stem rises from the midst of the leaves, is short, thick, and smooth, and terminates in a spike of numerous imbricated bracts, between which the flowers issue.

Hab.—Cultivated abundantly in Hindostan, China, etc.

Curcuma. (*Rhizoma.*) *L.*

Description.—Turmeric is constituted by the branches of the rhizome, which are met with in the *form* of slightly-curved cylindrical pieces, having a thickness about that of the little finger. *Colour*, grayish-yellow externally, reddish-brown and glistening, internally. *Consistence*, hard; not very brittle. *Odour* and *taste*, aromatic and peculiar.—This is known as Long Turmeric; but there is another variety, known as Chinese or Round Turmeric, which occurs in the *form* of roundish masses, pointed at one end, having transverse annular wrinkles on the external surface.

Chem. Comp.—The tubers of turmeric contain *colouring matter*, a *volatile oil*, a *gum-resin*, besides woody fibre, gum, salts, etc.—

Colouring matter, called by some *curcumine*, is of a yellow colour, little soluble in water, but more so in alcohol, possessing neither odour nor taste, is rendered dark *brown* by the action of *alkalies;* hence turmeric has been used as the test for the presence of these bodies: but concentrated mineral and boracic acids, and many metallic salts, also colour it red; so that it is not a certain test. The *volatile oil* possesses a strong odour, and gives to turmeric its medicinal properties.

Oper. and Uses.—Its only internal use is as a condiment, entering into the formation of curry-powder. It is used, however, by the chemist as a test of alkalinity, a free alkali changing the yellow colour to a brown. For this purpose, *paper* is imbued with its colouring matter by brushing it over with a decoction of the rhizome, and then drying it.

MARANTACEÆ.

Maranta Arundinacea.—The Arrow-Root.

Monandria, Monogynia.

An herbaceous plant, having a horizontal tuberous rhizome, from which several pointed *stoles* arise, covered with scales; these latter, being long and curved, assume at length an upright direction, and appearing above the surface of the earth constitute new plants: they are white, fleshy, and amylaceous, being that part from which arrow-root is procured. The stem rises to the height of two or three feet, with alternate sheathing leaves: its flowers are small and white, and grow in loose terminal panicles.

Hab.—Cultivated in the West Indies.

Maranta. U. S. (*Rhizomatis fæcula.*) *L.*

Description.—It is met with in the *form* of an impalpable powder or friable grains, varying in size up to that of a pea, crackling when pressed in the hand. It has a snow-white *colour*, and slightly glistening aspect; without *odour*, and with very little *taste.*

Preparation.—The stoles proceeding from the rhizome are

beaten into a pulp, and afterwards stirred in cold water; the starch which they contain is thus separated from the fibrous part, which is removed by hand, and the milky liquor strained. After standing for a time, the starch subsides; and, after being washed, is allowed to dry in the sun, constituting the arrow-root of commerce.

Common Source.—West Indies; an inferior kind sometimes comes from Calcutta.

Chem. Comp.—The same as that of starch. Under the microscope, it is found to be composed of granules of rather an irregular shape.

Adulteration.—Potato starch is sometimes substitued for arrow-root. This may be suspected when it has a more than usually glistening appearance to the naked eye; and detected with certainty by the microscope, the globules of potato starch being much larger than those of arrow-root, and displaying concentric markings upon their surface.

Oper. and Uses.—Demulcent; and employed as a bland article of diet for invalids.

IRIDACEÆ.

Crocus Sativus.—The Saffron Crocus.

Triandria, Monogynia.

The plant consists of a roundish cormus, giving rise to numerous linear leaves, enveloped at the base altogether in a membranous sheath. The flowers are large and of a light purple colour, not rising so high as the leaves, and placed upon a slender succulent tube: the style terminates in long wedge-shaped stigmata, of a deep orange-colour.

Hab.—Asia Minor. Cultivated in England as well as in France and Spain.

Crocus. U.S. (*Stigmata exsiccata.*) *L.*

Description.—Saffron consists of the stigmata, and part of the style of the flowers plucked out and carefully dried. It has

a deep orange colour, and a bitter aromatic taste. This is termed *hay* saffron: another variety called *cake* saffron ought to consist of the stigmata made into cakes by compression, but Dr. Pereira states that, for the most part, it contains no saffron at all, being composed of saffleur agglutinated by means of gum-water.

Commer. Source.—The best saffron is imported from Spain, and an inferior quality from France, little or none of English growth being found in the shops.

Chem. Comp.—Saffron consists of about 7·5 per cent. of *volatile oil*, to which it owes any medicinal properties it may possess; besides this, it contains a *colouring matter*, also gum, wax, albumen, lignine, etc. The colouring matter is much altered by reagents, becoming blue by action of sulphuric acid, and green by that of nitric acid.

Adulteration.—The substitution of saffleur is detected by infusing it in hot water, which will display the form of the petals.

Oper. and Uses.—A variety of beneficial effects have been ascribed to the medicinal employment of saffron, arising, probably, out of the old error of *post hoc, ergo propter hoc.* It has thus been celebrated at various times as stimulant, narcotic, and emmenagogue, and is popularly employed as having some specific influence over the progress of exanthematous eruptions. Most persons, however, look upon it merely as a mild aromatic and colouring matter, for which purposes it is added to other medicines.

Dose.—Grs. xij.—℈ij.; it may be used in the form of infusion.

Off. Prep.—*Syrupus Croci. L.* (An infusion of saffron made into a syrup with sugar.) Used as a colouring addition to draughts and mixtures.

SMILACEÆ.

Smilax.—Species of Smilax yielding Sarsaparilla.

Diœcia, Hexandria.

The genus Smilax is constituted of diœcious climbing plants,

three species of which are believed to furnish the sarsaparilla of commerce, distinguished by peculiarities which attach to their leaves and stems.

S. Officinalis.—*Stem*, quadrangular, smooth, and prickly. *Leaves*, one foot in length, ovate-oblong, smooth, coriaceous, and cordate.—Furnishing *Jamaica*, and probably *Lima* and *Honduras* sarsaparilla.

Hab.—The banks of the Magdalena, in Colombia.

S. Medica.—*Stem*, angular, with strong prickles at the knots, but few in the intervals. *Leaves*, six inches long, cordate-ovate or hastate.—Furnishing *Vera Cruz* sarsaparilla. *Hab.*—The Mexican Andes.

S. Syphilitica.—*Stem*, round and prickly at the knots only. *Leaves*, one foot long, oblong-lanceolate, and having a long tendril terminating the stipules.—Furnishing *Brazilian* sarsaparilla.

Hab.—The banks of the Cassiquiare, in Brazilian Guiana.

The London Coll. attributes Sarza to the S. officinalis only.

Sarza (*Radix.*) *L.*

Sarsaparilla. U. S.

Description.—*Form*, the roots are marked by longitudinal wrinkles, and imported made up into bundles, which are mostly spirally folded; more or less of the smaller radicles are attached, and, occasionally, portions of the rhizome and stem, which are termed the *chump*. *Size* of the roots, several feet long, and the thickness about that of a goosequill. *Colour*, red, brown, or grayish. *Consistence*, more or less bitter, and the *fracture* often powdery. *Section* of the root displays a central *pith* surrounded by a *woody zone*, and external to this a *bark* consisting of two parts, an outer thinner portion and an internal thicker. *Odour*, earthy. *Taste*, mucilaginous, becoming acrid after chewing for a short time.

Varieties.—There are five kinds of sarza imported into this country, viz.—1. *Jamaica*, the root of the *Smilax off.* is imported by way of Jamaica, either from the Magdalena river, or from the Mosquito shore, on the eastern coast of Honduras. It is the most esteemed variety, yielding the greatest amount of extract.—

2. *Brazilian* or *Lisbon*, probably obtained from the *S. syphilitica*, is either imported from some of the Brazilian ports, or comes to us by way of Lisbon. It is preferred by some on the ground of its more nauseous taste, looking upon this as an indication of goodness.—3. *Lima* or *Valparaiso*, probably yielded by the *S. officinalis*, is imported from Lima and Valparaiso.—4. *Honduras*, probably obtained from the *S. officinalis*, is imported from Honduras Bay.—5. *Vera Cruz*, the root of the *S. medica*, is imported from Vera Cruz, but rarely met with in commerce.

These several varieties are distinguished by the form of the bundles, the quantity of rootlets, the presence or absence of the chump, the colour, thickness, and colour of the inner bark, quantity of starch, and amount of extract they yield.

1. Jamaica.—*Form* of bundles, spirally folded.
   Rootlets, long, and very numerous. (*Bearded* sarsaparilla.)
   Chump, absent.*
   Colour, brown, with an orange-red tint. (*Red* sarsaparilla.)
   Inner bark and *pith*, red.
   Starch, not so abundant as in the other varieties.
   Extract obtained from it, very abundant.
2. Brazilian.—*Form* of the bundles, unfolded, 3 to 5 feet long, and 1 foot diameter, bound tightly round with spiral withes; fewer longitudinal wrinkles.
   Rootlets, very few.
   Chump, absent.
   Colour, reddish-brown.
   Starch, abundant.
3. Lima.—*Form* of the bundles, folded.
   Chump, present.
   Colour, grayish-brown.
   Starch, not very abundant.
   Extract, less than from Jamaica.
4. Honduras.—*Form* of the bundles, folded.
   Rootlets, few.
   Chump, absent.

* *Chump* are the remains of the rhizome and stem.

Colour, grayish-brown.

Inner Bark, very thick and white, and readily broken off.

Starch, very abundant, falling out as fine dust on rubbing it.

Extract obtained from it, half that from Jamaica.

5. Vera Cruz.—*Form* of the bundles, unfolded.

Rootlets, few.

Chump, present.

Colour, light grayish-brown.

Starch, very scanty.

In order to facilitate acquiring the distinctions of these varieties, we will classify them as follows.

Folded.	Chump present,		*Lima.*
	Chump absent,	rootlets numerous; inner bark red,	*Jamaica.*
		rootlets few; inner bark white,	*Honduras.*
Unfolded.	Chump present, starch scanty,		*Vera Cruz.*
	Chump absent, starch abundant.		*Brazilian.*

Chem. Comp.—Sarsaparilla contains a principle called *smilacine*, a trace of *volatile oil*, a bitter *resin*, gummy extractive, *starch*, (of which the Honduras variety contains the largest quantity,) lignin, salts, etc. *Smilacine* occurs in small white acicular crystals, little soluble in cold water, but more so in hot; soluble in alcohol, ether, and oils; the solutions are neutral, and possess a bitter taste. Smilacine is coloured red, then violet by sulphuric acid; the crystals contain 8·56 per cent. of water. The formula of smilacine is unknown, but it contains *no nitrogen*, but consists of carbon, hydrogen, and oxygen only. It has been represented by $C^6H^5O^2$. Its action on the system is likewise unknown; and it is doubtful whether or not it gives to sarsaparilla any of its medicinal properties.

Chem. Rel.—The starch which the sarsaparilla contains, gives to the decoction most of the reactions which it exhibits.

Oper. and Uses.—Various opinions are held with respect to the medicinal use of Sarsaparilla; one class of practitioners maintaining that if it do not possess any very energetic physiological

operation, it nevertheless exerts a valuable influence over a variety of unhealthy states of the constitution; others, again, hold that it is no more serviceable than an equal quantity of solution of starch. Its operation has been denominated tonic and demulcent, but alterative is the term most frequently applied to it. It is believed also to augment the secretions of the sweat and urine. It is administered in the various forms of *scrofula* and *syphilis*, rarely, however, alone, but combined with acids or alkalies, as well as other vegetable and mineral remedies. No doubt chronic cutaneous affections, glandular swellings, enlargements and painful diseases of the joints, bones, fasciæ, etc., sometimes disappear under its use; but still we must suspend our judgment respecting the part which it takes in their *cure*, until the influence of time, regulated diet, and other medicinal agencies usually combined, shall have been correctly ascertained.

Dose.—Of the powdered root ʒß—ij.

Off. Preps.—*Decoctum Sarzæ. L.* (Sarza, ℥v., after being macerated in boiling distilled water, Oiv., is bruised, again macerated and boiled.) *Dose*, f℥iv.—viij., three or four times a day. It froths a great deal when shaken.

Decoctum Sarzæ Compositum. L. (Decoction of sarsaparilla, Oiv., boiled with sliced sassafras, turnings of guaiacum-wood, bruised liquorice, each, ʒx., and mezereon, ʒiij., and strained.) *Dose*, f℥iv.—vi., three or four times a day. It is apt to nauseate when taken in such large quantities as are generally used. The *fluid extract* of the Edinburgh Pharmacopœia mixed with a moderate quantity of water is equally efficacious with either of the decoctions, and sits more easily upon the stomach.

Extractum Sarzæ. L. (This is directed by the London College to be prepared as the extract of gentian.) Dr. Pereira recommends that the Jamaica variety be used, and states that the root fibres "are to be preferred as containing less starch and woody fibre and a larger quantity of the cortical layer." *Dose*, grs. x.—xx.

Syrupus Sarzæ. L. (A hot decoction of sarsaparilla, made with sarza, ℥xv., and water, *cong.* j., is strained and made into a syrup with sugar, ℥xv.) This is a perfectly useless preparation. *Dose*, f℥j.—iij.

Syrupus Sarsaparillæ. U. S. (Sarsaparilla, bruised, ℔ij.; guaiacum wood, ℥iij.; red roses, senna, liquorice root, each, ℥ij.; oil

of anise, oil of sassafras, each, ♏v; oil of partridge-berry, ♏iij.; sugar, ℔viij.; alcohol, Ox. Macerate, express, filter, evaporate to Oivss., add sugar and form syrup; when cold add oils. *Dose*, f℥ss.

Infusum Sarsaparillæ. U. S. Sarsaparilla, bruised, ℥j., boiling water, Oj., digest and strain.

Extractum Sarsaparillæ. U. S. Sarsaparilla, in coarse powder, ℔j.; diluted alcohol, Oiv., make tincture by displacement, distil off alcohol, and evaporate to due consistence. *Dose*, grs. x.—℈ss.

LILIACEÆ.

Squilla Maritima.—The Officinal Squill.

Hexandria, Monogynia.

This plant possesses a large imbricated bulb, giving rise to a round smooth stem, which terminates in a close raceme of white flowers seated upon purplish peduncles. Its leaves, which appear subsequently to the flowers, are long, broad, lanceolate, and pointed, and of a deep green colour.

Hab.—The coasts of the Mediterranean.

Scilla. U. S. (*Bulbus recens.*) *L.*

Description.—The fresh bulb is of a pear-shaped *form*, and consists of concentric scales, the inner ones being whitish, thick and fleshy, and the outer thin, dry, membranous, and of a brownish-red colour. It varies in *size* from that of the fist to that of the human head.

Description of Dried Squill.—In the preparation of dried squill, the outer coats are stripped off, and the bulb cut transversely into slices, which are dried by a gentle heat. It is mostly imported in this state. Dried squill occurs in the shops in the *form* of pieces, whose shape and size indicate the mode of their formation; their *colour* is yellowish-white, and somewhat translucent; their *consistence* dry, brittle, and pulverizable, but they

readily absorb moisture, becoming tough and flexible. *Odour*, none. *Taste*, mucilaginous, bitter, and nauseous.

Commer. Source.—Malta, and other Mediterranean ports.

Chem. Comp.—Squills, when fresh, contain *an acrid matter* which is lost by drying, the nature of which is not understood. We find also in squills a substance called *scillitine*, together with tannic or gallic acid, gum, woody fibre, salts, etc.—*Scillitine*, not obtained pure, but mixed with sugar, etc., occurs as a brittle mass of a very bitter taste, soluble in water and alcohol, also in acids; its chemical nature is not understood. It possesses the active properties of the squills.

Operation.—In large doses, squill produces vomiting, sometimes accompanied by purging; but, when smaller quantities are administered, merely occasions nausea, facilitates expectoration, and augments the urinary secretion. Both to obtain its diuretic and its expectorant operation, however, the dose should be sufficiently large to give rise to some amount of nausea. The combination of mercury, digitalis, or a saline diuretic, assists its action upon the kidneys.

Uses.—It is at present rarely employed with the view of producing vomiting. Its use as an *expectorant* is generally avoided when any amount of acute inflammation is proceeding in the lungs; but, when this has been subdued, or in chronic cases, its administration is commonly had recourse to. As a *diuretic* it is useful in *dropsies*, where a remedy of this class is indicated; and in these cases, is often administered as a pill with mercury and digitalis.

Dose of powdered squill, grs. j.—iij. or more, so as to induce nausea.

Off. Preps.—*Acetum Scillæ. L. U. S.* (Dried squill, ℥xv. [℥iv. U. S.], is macerated in vinegar, Ovj. [Oij. U. S.], and after standing twenty-four hours the liquor is pressed out, the dregs allowed to subside, and a little spirit, Oss. [f℥j. U. S.] added.) *Dose*, fʒß—jß. It is one of the best preparations of the drug.

Oxymel Scillæ. L. U. S. (The above, Ojss., boiled down with honey, ℔iij.) Commonly administered to children as an emetic, at the commencement of affections of their air-tubes. *Dose*, fʒj.—ij.

Pilulæ Scillæ Compositæ. L. U. S. (Powdered squill, ʒj.,

ginger, and ammoniacum, each, ʒij., and beaten into a mass with soap, ʒij., and syrup, q. s.) *Dose*, grs. v.—xx.

Tinctura Scillæ. L. U. S. (Dried squill, ℥v. [℥iv. U.S.], macerated in proof spirit, Oij.) *Dose*, ♏x.—fʒj.

Syrupus Scillæ Compositus. U. S. (Squill, bruised, senega, bruised, each, ℥iv.; tartrate of antimony and potassæ, gr. xlviij.; water, Oiv.; sugar, ℔iijss. Pour the water on the squill and senega, boil to one half, strain, add sugar, evaporate to Oiij., and whilst hot, dissolve in it the tartar emetic.) *Dose*, grs. x.—fʒj.

Allium Sativum.—The Common Garlic.

Hexandria, Monogynia.

Cultivated in this country.

Allium. U. S. (*Bulbus.*) *L.*

Description.—The bulb consists of several smaller *cloves*, has a strong *odour* similar to that of assafœtida, with a sweetish, acrid, and peculiar *taste*.

Chem. Comp.—Garlic owes its medicinal properties to a *volatile oil*, of which it contains about $\frac{1}{200}$th of its weight. The other ingredients being gum, lignin, extractive, water, etc.—*Volatile oil:* this passes over with the first portions of water, when garlic is distilled with that fluid, is heavier than water, of a yellow colour, very powerful odour, and acrid taste, and possesses rubefacient properties when applied to the skin. It possesses sulphur in its composition.

Oper. and Uses.—Stimulant, diaphoretic, and diuretic, imparting its odour to the secretions. Its diuretic operation has been advantageously employed in cases of dropsy, and it has been celebrated as an anthelmintic against ascarides. Its disagreeable odour, however, is against its common or frequent use.

Dose.—ʒj.—ij.

Aloë.—Species of Aloë yielding Aloes.

Hexandria, Monogynia.

The plants which yield medicinal aloes are known by the possession of thick, fleshy, stiff, and pointed leaves, more or less

closely toothed, and terminating in a spine. Their flowers are arranged in long spikes or racemes, and have a tubular, 6-cleft and fleshy perianth, nectariferous at the base, and with hypogynous stamens. The fruit is a membranous, three-cornered capsule. The several varieties of the drug are believed to be yielded by three species.

1. *A. vulgaris.—Hab.* East Indies, cultivated in the West Indies, etc. Yielding *Barbadoes* aloes.

2. *A. Socotrina.—Hab.* Socotra, near the mouth of the Arabian Gulf. Yielding *Socotrine* aloes and probably *East Indian.*

3. *A. spicata.—Hab.* Cape of Good Hope. Yielding *Cape* aloes.

The London College attributes medicinal aloes to the A. spicata only; a statement manifestly erroneous.

Aloë. U.S. (*Foliorum succus spissatus.*) *L.*

Varieties.—There are four principal varieties of aloes in English commerce, viz.—1. The *Socotrine*, yielded by the *A. Socotrina*, is prepared in the island of Socotra. True Socotrine aloes is very rarely found in the market; what passes under this name being the finer kinds of East Indian or Hepatic, imported from Bombay.—2. The *East Indian or Hepatic*, probably derived from the same plant, is also imported from Bombay, though originally derived from the shores of the Arabian Gulf. The Socotrine aloes often forms a vein in a cask of this kind.—3. *Barbadoes*, afforded by the *A. vulgaris* and other species, is imported from Barbadoes, but prepared in other of the West Indian Islands.—4. *Cape*, obtained from the *A. spicata*, and probably other species also, is imported from the Cape of Good Hope. It varies very much in goodness.

They are distinguished as follows:—

1. *Socotrine.—Colour*, garnet-red, with a full resinous lustre; and garnet-red translucency in thin layers. *Consistence*, brittle and easily pulverized. *Fracture*, smooth and conchoidal. *Odour*, fragrant. *Taste*, very bitter. It is *entirely* dissolved by *spirit*, without any residue; and this distinguishes it from all other varieties passing under the same name, since they all leave more or less flocculent matter undissolved. *Colour of the powder*, a fine golden-yellow.

2. *East Indian or Hepatic.—Colour*, dark liver-brown, with little lustre and scarcely any translucency except on the mere edges. *Consistence*, less brittle than the Socotrine. *Fracture*, with a waxy lustre. *Odour*, less fragrant than the Socotrine. *Diluted spirit* leaves much insoluble fleecy matter, but least in those pieces which most resemble the Socotrine. *Colour of the powder*, a golden-yellow.

3. *Barbadoes.—Colour,* varying from a brownish-black to a liver-colour, and with a dull lustre; almost complete opacity of its edges or thin layers. *Consistence*, slightly brittle. *Odour*, strong and unpleasant, similar to that of the axilla. *Colour of the powder*, a dull olive-yellow.

4. *Cape.—Colour*, deep brown, with a greenish shade and an almost vitreous lustre, with much yellowish-brown translucency in thin layers. *Consistence*, compact, very brittle, and easily pulverized. *Odour*, strong, not disagreeable. *Colour of the powder*, bright yellow.

A black, fœtid, much adulterated kind of Cape aloes is known as *caballine* aloes.

Chem. Comp.—The nature of aloes is not yet well understood; but it is known to contain from 50 to 80 per cent. of a bitter matter, soluble in cold water, which has been named *aloesin;* and the remainder consists of a substance possessing, in some degree, the properties of a *resin.*

Aloesin or *bitter principle,* soluble in water and spirit, but not in anhydrous alcohol, or ether: the watery solution is made lighter by acids, and darker by the alkalies and salts of iron. It contains nitrogen in its composition, and, by the action of nitric acid, gives rise to several acids, varying with the strength of the acid, as the polychromic acid, which produces a purple dye in solution; chrysammic acid ($HO, C^{15} H N^2 O^{12}$), whose salts are red; chrysolepic acid ($HO, C^{12} H^2 N^3 O^{13}$), which crystallizes in golden scales.

Resinous matter.—This is probably formed by the action of the atmosphere on the bitter principle. Chlorine produces a similar substance when it acts upon the bitter matter. The resinous matter is soluble in boiling water, thus differing from a resin: it is soluble also in alcohol, ether, and alkaline solutions.

Operation.—The operation of aloes varies with the dose in

which it is administered. In very small quantities, it appears to act as a tonic upon the stomach and intestines: but in larger, evacuates the bowels as a purgative. The latter effect appears in great measure to depend upon an increase in the peristaltic movements of the canal, but not entirely, since the stools are invariably more fluid than natural. The same results when it is brought in contact with other absorbing surfaces upon the exterior of the body. It is commonly believed that aloes specifically affects the lower intestines; and some, accordingly, suppose that its habitual use promotes the occurrence of hæmorrhoids, or, at any rate, aggravates them when actually present. We are not, however, at all satisfied as to the frequency of this. This specific operation of aloes is said not to be confined to the rectum, but to influence other pelvic organs also, in such a manner, that, under certain circumstances, it may prove emmenagogue. The stools which it gives rise to, are sometimes accompanied by straining, and a sensation of heat in the rectum. It is asserted that its purgative action is increased, while its tendency to irritate the rectum is diminished, by combination with aromatics, soap, some vegetable bitters, henbane, or sulphate of iron: the latter especially is strongly recommended by Dr. Christison.

Uses.—Aloes is one of the best purgatives for frequent employment in *habitual constipation*, arising from an atonic state of the intestinal tube, which commonly occurs in debilitated individuals, and such as are debarred from that amount of active exercise which is essential to the correct performance of its functions. It is useful in some cases of *atonic dyspepsia*, accompanied by constipated bowels. Whatever be its emmenagogue powers, aloes is as good a purgative as can be employed in that form of *amenorrhœa* which is associated with an anæmic condition of the general system.

Dose.—Grs. v.—xx.

Off. Preps.—*Extractum Aloës Purificatum. L.* (Powdered aloes, ℥xv., are macerated in boiling water, *cong.* j., and strained; and after the dregs have been allowed to subside, the clear liquor is evaporated to a proper consistence.) *Dose*, grs. v.—xv.

Pulvis Aloës Compositus. L. (Powdered aloes, ℥jss., and guaiacum resin, ℥j., mixed with compound cinnamon powder, ℥ss.) *Dose*, grs. x.—xx.—Diaphoretic and purgative.

Pilulæ Aloës Compositæ. L. (Powdered aloes, ℥j., extract of gentian, ℥ss., and oil of caraway, ♏xl., beaten into a mass with syrup, q. s.) *Dose*, grs. v.—xv.

Pilulæ Aloës cum Myrrhâ. L. (Powdered aloes, ℥ij., myrrh, and saffron, each, ℥j., beaten into a mass with syrup, q. s.) This and the former are both useful pills in habitual constipation, and in amenorrhœa. *Dose*, grs. v.—xx.

Decoctum Aloës Compositum. L. (Powdered aloes, myrrh, and saffron, each, ʒjss., the ingredients of the above pills, are boiled in water, Ojss., with liquorice, ʒvij., and carbonate of potash, ʒj., and strained; some tincture of cardamom, f℥vij., being subsequently added.) It is a useful addition to the compound iron mixture, in order to obviate the constipation which the latter preparation is apt, when given alone, to induce. *Dose*, f℥ß—ij.

Tinctura Aloës. L. U.S. (Powdered aloes, ℥j., and extract of liquorice, ℥iij., macerated in rectified spirit, Oss., and water, Ojss., and strained.) *Dose*, fʒij.—f℥j.

Tinctura Aloës Composita. L. (Aloes, ℥iv., [℥iij. U.S.] and saffron, ℥ij., [℥j. U.S.] macerated in tincture of myrrh, Oij., and strained.)—This preparation resembles the aloes and myrrh pill in its ingredients and uses. *Dose*, fʒß—ij.

Vinum Aloës. L. U.S. (Powdered aloes, ℥ij., [℥j., U.S.] and canella, ʒiv., [cardamom, and ginger, each, ʒj., U.S.] macerated in sherry wine, Oij., [Oj., U.S.] and strained.) *Dose*, f℥ß—j.

Enema Aloës. L. (Two scruples of aloes and fifteen grains of carbonate of potash mixed up with half a pint of barley water.)

MELANTHACEÆ.

Colchicum Autumnale.—The Meadow Saffron.

Hexandria, Trigynia.

This plant consists of a cormus, which, growing from the base of a previously existing one, sends up in the autumn, when quite small, a purple flower, very similar to the common crocus in appearance; the flower is distinguished, however, by the more elongated and lance-shaped form of the lobes of the perianth, and by the anthers bursting outwardly. After the flower has

died away, the young bulb continues to grow, and, in the spring, becomes crowned with erect, broadly lanceolate leaves supporting the capsule in their axis. As the summer advances, the adult cormus gives origin at its base to a new one, which passes through the same changes as its parent, whilst the latter withers; and after being for some time attached to the lower part of its progeny, finally decays.

Hab.—Indigenous to England and many parts of Europe.

Colchici Cormus (*Cormus*). *L.*

Colchici Radix. U.S.

Description.—*Form*, rounded, but flattened on one side where a new cormus is forming. *Size*, about that of a chestnut. *Colour* externally, brown, the *section* being white, and exhibiting an acrid milky juice. *Consistence*, solid. *Odour* of the cut cormus, irritating. *Taste*, bitter and acrid.

Preparation.—The cormus ought to be collected in July and August, after the leaves have withered, but commonly they are gathered later, in consequence of being more easily discovered while the flowers are attached. The mode of drying the cormus is similar to that adopted with the squill. The outer coats are to be removed and the cormus cut transversely into thin slices, which are dried at a temperature not exceeding 150°. The slices should *not* be *shrivelled*, but of an oval or rounded *form*, a grayish-white *colour*, and have a strong, bitter, and somewhat acrid *taste*.

Chem. Comp.—The cormus of the colchicum autumnale yields, on analysis, an *alkaloid* (colchicia) united with *gallic acid* (?); *fatty matters* yielding both fixed and volatile fatty acids, the latter resembling very much cevadic acid, together with starch, inuline, gum, yellow extractive, lignin, etc. Season influences much the quantity of the alkaloid contained in the cormus.

The *seeds* probably contain both the alkaloid and gallic acids.

Colchicia, thought to be the same as veratria, but has been described by Geiger as differing from that alkaloid. It occurs in colourless prisms or needles, very bitter and acrid, without odour, and has a slight alkaline reaction; it is soluble in water, alcohol,

and ether; the solutions are precipitated *yellow* by the chloride of platinum, (the double chloride of platinum and colchicia,) and *white* by the infusion of nut-galls. Nitric acid strikes a violet-blue colour with colchicia, which rapidly changes to green and yellow. Colchicia forms salts with acids: some are crystallizable. Its composition is unknown. It is a very powerful poison. It differs from veratria in being less acrid, crystallizable and soluble in water.

Chem. Rel.—The cormus or its solutions give indications of the presence of *starch*, *gallic* (?) *acid*, and the *alkaloid* (?), by the appropriate tests for these bodies, viz., iodine, persalts of iron, and infusion of nut galls.

Operation.—The obvious operation of considerable doses of any of the preparations of colchicum is purgative, irritating the alimentary mucous membranes, and giving rise to nausea and vomiting. It possesses considerable sedative powers in rheumatism and gout, exercising a distinct influence over these forms of specific inflammation. It is believed to act on the secretions generally, not only increasing the urine, but also those of the skin, liver, and intestinal canal. A further effect has been stated to result in the case of the urine, namely, an augmented amount of its uric acid and urea: but it appears very doubtful whether this is at all an effect of its exhibition.

Use.—The principal value of colchicum is seen in its application to the cure of *gout* and *rheumatism*. For the former it is especially well adapted, plethora and fever being removed by the simultaneous employment of blood-letting and appropriate evacuants. It is best fitted for the acute and for the hot forms of the chronic disease; but, though rheumatism often gives way under its judicious use, we have frequently observed it to fail. Much doubt prevails as to the mode in which its beneficial influence is exerted. Some hold its purgative action to be the most important link in the cure; and they, accordingly, favour it by combination with other cathartics; others consider that when purgation is produced, no good result can be expected to ensue; and we must admit that these are the cases in which colchicum has proved, in our hands, the least efficacious. Among the latter class of practitioners are included those who regard gout and rheumatism as dependent on contamination of the blood with undischarged urea

and uric acid, and administer colchicum with a view to the evacuation of these principles, which they regard as the *materies morbi.* Several considerations, however, prevent our subscribing fully to this doctrine, which we are not aware to be established upon any but hypothetical grounds, although Dr. Williams appears to consider it as corroborated by some experiments carried on in University College Hospital.—(*Principles of Medicine*, p. 120.) Colchicum is rarely employed in any affections unconnected with these forms of disease.

Dose.—Grs. ij.—viij., of the powdered cormus.

Off. Preps.—*Vinum Colchici. L. Vinum Colchici radicis. U. S.* (Dried cormi of the colchicum, ℥viij.. [℔j., U. S.,] sliced and macerated in sherry wine, Oij.) *Dose,* ♏xx.—fℨj.

Acetum Colchici. L. U. S. (Colchicum, ℥j., [℥ij., U. S.,] is macerated in distilled vinegar, f℥xvj., [Oij., U. S.,] and, after the liquor has been pressed out, and the dregs allowed to subside, a little spirit, f℥j., is added.) *Dose,* fℨß.—ij.

Extractum Colchici. L. (Prepared as the extract of aconite.) *Dose,* gr. j.—ij.

Extractum Colchici Aceticum. L. (Fresh cormi of the colchicum, ℔j., are bruised, and sprinkled gradually with acetic acid, f℥iij., the juice is then pressed out, and evaporated to a proper consistence.) *Dose,* grs. j.—iij.

Colchici Semina. U. S. (*Semina.*) *L.*

Description.—The seeds of colchicum are *rounded*, rough, and small, and have a dark brown *colour.* Their *taste* resembles that of the cormus. They ought to be gathered when quite ripe.

Chem. Comp.—See Colchici Cormus.

Oper. and Uses.—The same as of the cormi; they are, perhaps, more to be relied upon. *Dose,* grs. ij.—viij.

Off. Prep.—*Tinctura Colchici. L. Tinctura Colchici Seminis. U. S.* (Bruised colchicum seeds, ℥v., [℥iv., U. S.,] macerated in proof spirit, Oij., and strained.) *Dose,* ♏xx.—fℨj.

Tinctura Colchici Composita. L. (Bruised colchicum seeds, ℥v., macerated in aromatic spirit of ammonia, Oij., and strained.) *Dose,* ♏xx.—fℨj. A more stimulant preparation than the preceding.

Veratrum Album.—The White Hellebore.

Polygamia, Monœcia.

This plant consists of a perennial cylindrical rhizome, giving rise to a strong upright stem, which attains the height of about four feet, and terminates in a large branched panicle of greenish-yellow polygamous flowers. Its leaves are large, oval, ribbed and plaited, surrounding the stem at its base.

Hab.—The south of Europe.

Veratrum (*Radix.*) *L.*

Veratrum Album. U. S.

Description.—The officinal part of the plant is the rhizome. Its *form* is cylindrical and rather conical, having numerous radicles attached. *Size*, 2 to 4 inches long, 1 inch diameter. The *surface* is corrugated and of a blackish-brown *colour*. *Odour*, none. *Taste*, sweetish at first, but afterwards bitter and acrid.

Chem. Comp.—White hellebore root contains an *alkaloid* (*veratria*) united with *gallic acid* (?), a *fatty matter* yielding a volatile fatty acid similar to cevadic acid, yellow extractive, gum, starch, and lignin, etc.—*Veratria*, see p. 429.

Another principle called *Jervine* has been found in the veratrum album, white and crystallizable, insoluble in water, but soluble in alcohol, forming very insoluble salts with mineral acids, thus distinguished from veratria. *Formula*, $C^{60}H^{45}N^{2}O^{5}$.

Oper. and Uses.—White hellebore is a topical irritant, and when administered internally in very large doses, gives rise, like other acrid poisons, to violent symptoms of gastro-enteritis. In moderate quantities, however, it has been used therapeutically as an emetic and purgative, and, in the same manner as the black hellebore, has been recommended for employment in *maniacal affections*. At present it is only used as a lotion for the destruction of pediculi. *Dose*, grs. j.—ij.

Off. Preps.—*Decoctum Veratri. L.* (Powdered white hellebore, ℥x., is boiled down with distilled water, Oij.; and, when cold, some rectified spirit, f℥iij., is added, and the liquor ex-

pressed and strained.) It is only used as a wash for the purpose above-mentioned.

Vinum Veratri. L. (Sliced white hellebore, ℥viij., macerated in sherry wine, Oij., and strained.) *Dose,* ♏x.—xl. It has been used as a remedy for gout.

Unguentum Veratri. L. (Powdered white hellebore, ʒij., mixed with lard, ℥viij., and oil of lemon, ♏xx.) Used as the decoction.

Asagræa Officinalis.—The Spike-flowered Asagræa.

Hexandria, Trigynia.

[A tall bulbous plant, with linear, acuminate leaves, four feet long. The scape is round and about six feet high. The raceme of flowers is a foot and a half long, very dense; the flowers are white, with yellow anthers and bracteate. The follicles are three, acuminate and papery, containing a few seeds.]

The London College calls this plant the *helonias* officinalis.

Hab.—The Andes, near Jalapa.

Sabadilla (*Semina*). *L.*

Description.—The seeds are curved, pointed, shrivelled, and slightly winged, of a shining dark brown *colour*, and have an acrid bitter *taste.* They are imported in their *follicles*, which are thin and papery, of an ovate-oblong *form*, and growing three together, adherent at their bases.

Chem. Comp.—Sabadilla seeds contain *veratria* united with *veratric* acid, *fatty* bodies yielding, besides the ordinary fatty acids, one which is *volatile*, called *cevadic acid*, also wax, resin, extractive, gum, lignin, salts, etc.

Veratria, an alkaloid found also in the Veratrum Album, see below.

Sabadillina, an alkaloid stated to exist with the veratria in the sabadilla seeds, crystallizing in stars composed of six-sided prisms, intensely acrid and bitter, soluble in hot water and alcohol, not in ether; the solutions have an alkaline reaction, the salts are crystallizable. Its formula has been represented by $C^{40} H^{25} N^2 O^{10}$(?).

A *red-coloured body*, having the composition of sabadillina, plus 1 eq. of water, is found in the mother liquor of sabadillina: it has been called *monohydrate of sabadillina;* it is soluble in water and alcohol, neutralizes acids, but does not form crystallizable salts; probably it is an impure substance.

A resinous body has been also found combined with veratria, soluble in alcohol, but not in water or ether.

Veratric acid (HO, $C^{18}H^{9}O^{7}$) can be extracted from the seeds of the sabadilla: it is probably the so-called gallic acid spoken of in the analysis of the seeds, and in that of the root of the veratrum album, and in colchicum autumnale. When pure, it occurs in thin white quadrangular prisms, very soluble in alcohol, little soluble in cold water, but more so in hot; insoluble in ether. Sublimed by heat, it forms crystallizable salts with bases; with ether it also unites and forms a radiated crystalline mass. Veratric ether (EO, $C^{18}H^{9}O^{7}$.)

Cevadic acid, called also sabadillic acid, a volatile, fatty acid, extracted by ether from the seeds; it sublimes in white, silky needles, fusible at 68° F. Composition unknown.

Oper. and Uses.—Sabadilla acts upon the system in the same manner as veratria, for the preparation of which it is introduced into the Pharmacopœia.

Off. Prep.—*Veratria.*

Veratria. L. U.S.

Preparation.—An *alcoholic extract* of sabadilla is directed to be treated with dilute *sulphuric acid*, so as to form a sulphate of veratria, and liberate the acid with which the alkaloid was combined. The solution thus formed is evaporated to the thickness of syrup, and decomposed by *magnesia*. The alkaloid is then taken up by spirit, reconverted into sulphate, purified by *animal charcoal*, and finally precipitated by *ammonia*.

Phys. Props.—It occurs in the *form* of a white, uncrystallizable powder, having a somewhat resinous appearance. Its *taste* is acrid.

Chem. Comp. and Rel.—Its *formula* is $C^{68}H^{45}N^{2}O^{12}$ (?). It is nearly insoluble in water, but soluble in alcohol and ether. Its

sulphate and hydrochlorate are crystallizable. Veratria is coloured first red and then violet by *sulphuric acid.*

Oper. and Uses.—Veratria is topically irritant, giving rise to feelings of heat and tingling in the part to which it is applied, mostly without redness or vesication: sometimes constitutional effects are manifested, as when it is taken internally. In the latter case, it operates as an excitant, occasioning a sensation of heat in the mouth and stomach, uneasy sensations over the surface of the body, and sometimes vomiting, purging, slowness and weakness of the pulse, and headache. It has been used externally and internally with variable success in *chronic rheumatism* and *neuralgia.* Dr. Christison observes, that, should veratria eventually prove deserving of a permanent place in the Pharmacopœias, certain Galenical preparations of cevadilla might be added, as being more simple and probably not less effectual.

Dose.—Gr. $\frac{1}{6}$ in the form of a pill.

PALMÆ.

Sagus Rumphii.—The Sago-Palm.

Monœcia, Polyandria.

[The shortest of the Palm tribe, but with a thick trunk, which is rough with the remains of the old leafstalks, and crowned with numerous, large, pinnate leaves, from the origin of which spring long, divided flower-stalks, bearing male and female flowers, the latter of which are succeeded by three-celled fruits, each cell containing a single seed.]

Hab.—Malacca, and the neighbouring islands.

Sago. U. S. (*Medullæ fæcula.*) *L.*

Description.—The sago generally found in the shops, is in grains: the finer kinds have the grains very small, passing under the name of *pearl* sago; the commoner variety has larger grains, as large or even of greater magnitude than pearl barley, varying in tint upon the surface.

Preparation.—The cellular structure is removed from the

interior of the stem, and reduced to powder: it is then mixed with water, and the liquor strained, and placed at rest, to allow of the subsidence of the starch; which, after washing, is granulated for exportation.

Chem. Comp.—Sago appears to consist almost entirely of starch.

Oper. and Uses.—Nutritive; and used, like arrow-root, as a diet for invalids.

ACORACEÆ.

Acorus Calamus.—The Sweet-Flag.

Hexandria, Monogynia.

The only plant of its order indigenous to this country: found abundantly in some watery places, especially in Norfolk. It consists of a horizontal rhizome, giving origin to long, ensiform leaves. Its flowers are green, small, and numerous, aggregated upon a tapering spadix, which projects at an angle from one side of the stalk which supports it: the latter is thick below the spadix, but leaflike above it.

Hab.—Europe, Asia, and North America.

Acorus. U. S. (*Rhizoma.*) *L.*

Description.—It occurs in the *form* of flattish jointed pieces, marked transversely on their upper surface with the remains of the leaves which arose from them; and, below, having elevated spots where the radicle fibres were attached. *Size:* the pieces vary in length, and are about half an inch broad. *Colour,* brownish-yellow externally, but purplish within. *Consistence,* spongy. *Fracture,* short. *Odour,* aromatic. *Taste,* warm and pungent.

Chem. Comp.—The rhizome of the acorus calamus possesses a *volatile oil* (obtained by distilling the rhizome with water), a *resin,* and a *bitter extractive;* to these it owes its medicinal properties: the other ingredients are common to all rhizomes, as starch, salts, etc.

Oper. and Uses.—The acorus calamus is tonic and stimulant, and has been recommended in the flatulence of *dyspepsia*, and as an antispasmodic in *ague*.

Dose of the powder, ℈j.—ʒj.; or it may be used in the form of infusion.

GRAMINACEÆ.

Triticum Vulgare.—Common Wheat.

Triandria, Digynia.

The London College confines the officinal articles yielded by wheat, without any good reason, to the var. hybernum.

Farina (*Seminum farina*). *L.*

Preparation.—Wheat, the seed of the plant, is ground in a mill, and sifted.

Chem. Comp.—Wheaten flour consists of several substances, which can be easily separated from each other. If flour be kneaded under a stream of water, we separate the *starch* and leave a mass which is very elastic. The starch forms about 70 per cent. of the flour; the elastic mass called *gluten*, about 12 per cent., but it is not a simple substance: by the action of alcohol, it can be separated into a substance insoluble in alcohol (coagulated albumen,) and one soluble in that fluid (glutin); besides which, we find in the water in which the flour has been kneaded, a little albumen (which can be coagulated either by heat or nitric acid), gum, sugar, and salts, as phosphates. (See *Chem. Introduction*, pp. 54 and 55.)

Chem. Rel.—Starch is detected by free iodine striking a blue colour with wheaten flour, or in the cold decoction.

Oper. and Uses.—*Flour* is one of the most useful applications which can be made to fresh *burns and scalds*, when dusted over them from a dredger. It acts by excluding the air. Gluten, or, in its absence, wheaten flour, is a very proper antidote for poisoning by *corrosive sublimate*. It may be kept in a dry state and

rubbed up with water when required for use. It forms an agreeable and allowable addition to the diet of diabetic patients. *Bread* is employed in pharmacy as a medium for administering some active medicines in the form of pills, as well as for the preparation of poultices. In making a poultice it is an object that it should be soft, but yet not so much so as to smear over the part. Accordingly, the bread employed should be carefully crumbled, and after being saturated with boiling water and standing by the fire for ten minutes, should be moderately pressed and allowed to cool to the temperature desired. It is then to be spread upon linen, but not so thickly as to render its weight inconvenient; and it may then be applied directly to the affected part.

Amylum (*Seminum fæcula*). *L.*

Description.—Starch occurs in the *form* of small prismatic pieces of a white *colour*, and a firm and brittle *consistence*. It has a short *fracture*, and neither *taste* nor *odour*.

Preparation.—Starch may be obtained by merely kneading flour in the hand under water: on a large scale, however, it is prepared without kneading, but by the aid of a stream of water. The gluten mixed with it is removed by permitting acetous fermentation to take place, when the acetic acid formed dissolves it all up. When sufficiently pure, the starch is dried, and splits into columnar pieces.

Chem. Comp. and Rels.—See Chemical Introduction, p. 55.

Oper. and Uses.—Starch, in the form of hair-powder, is used as a dusting material to prevent intertrigo of the cuticular folds in children. A decoction of starch is used as an injection to soothe the irritation of the large intestines in *dysentery*, etc., but commonly in conjunction with other medicines. It is also used as a *test* for the presence of free iodine, and as an antidote for poisoning with that substance.

Off. Prep.—*Decoctum Amyli. L.* (Starch is rubbed with water added in successive small quantities, and afterwards boiled for a short time.)

Hordeum Distichon.—Common Barley.

Triandria, Digynia.

Hordeum. U.S. (*Semina integumentis nudata.*) *L.*

Description.—*Pearl barley* occurs in rounded grains, and is merely the ordinary barley deprived of its husk and having the ends rounded off.

Chem. Comp.—It contains *starch*, *gluten*, *gum*, *sugar*, etc. Barley-water becomes thick on cooling.

Oper. and Uses.—Demulcent and nutritive. Barley-water is a useful drink in febrile diseases and intestinal irritation. Mixed with about an equal quantity of cow's milk and some sugar, it is a good substitute for the breast-milk for infants, when from any cause the latter is denied them.

Off. Preps.—*Decoctum Hordei. L. U.S.* (Barley-water is directed to be prepared by first washing away any impurities from the barley by means of some water, and then boiling it in a little more water for a short time.) This water is to be thrown away, and, more being added, it is to be boiled down to one-half and strained.

Decoctum Hordei Compositum. (Barley-water, Oij., mixed with half its bulk of water, is to be boiled down with figs, ℥ijss., liquorice, ʒv., and raisins, ℥ijss.)

Avena Sativa.—The Common Oat.

Triandria, Digynia.

Avena (*Semina integumentis nudata.*) *L.*

Avena Farina. U.S.

Preparation.—When the decorticated grains are crushed, they constitute *groats*, but when dried and ground they form *oatmeal.* Both are employed for making *gruel*, the former alone, however, being fit for the use of invalids.

Chem. Comp.—Oats consist of bran 34 per cent. and meal 66 per cent. The meal is similar to wheaten flour in its composition; but it contains less of the proteine compounds, viz., gluten, etc. The decoction of oatmeal, or water gruel, consists chiefly of a solution of starch.

Oper. and Uses.—Gruel is a common article of diet with persons suffering from mild inflammatory or febrile affections, and is frequently employed as an emollient enema.

Secale Cereale.—The Common Rye.

Triandria, Digynia.

Ergota. L. U.S.

We prefer introducing ergot under the plant which most commonly yields it, in consequence of the doubt which hangs over its real nature.

Nature and Source.—It is met with upon the fructification of certain graminaceous and cyperaceous plants, but most frequently upon the common rye, growing in every instance between the glumes, and therefore occupying the situation of the ovary. Several opinions have been advanced with respect to its origin and nature, of which the three following are the principal:—1°. It has been supposed to be a *fungus* growing in place of the ovary; and, under this view, received the name of *Spermœdia clavus.* 2°. It has been said to be merely a *diseased condition of the ovary* itself, produced by a wet season at the time of flowering, or by the punctures of the seed by insects. 3°. Others have more recently advanced the opinion, that, though not itself a fungus, it is nevertheless a *disease of the seed produced by a fungus,* whose sporidia are seen covering the surface of the young ergot as a white dust, along with cobweb-like filaments. This fungus has been named *Ergotœtia abortifaciens.*

Description.—*Form*, cylindrical and curved, marked with two longitudinal furrows. *Size,* 6 to 10 or more lines in length, and 1 to 4 lines in breadth. *Colour,* purplish externally, with a whitish bloom, grayish-white within. *Consistence,* firm, and it sinks in water. *Odour,* musty, fishy, and nauseous. *Taste,* slightly acrid.

Chem. Comp.—The peculiarity of the spurred rye consists in its containing a large quantity of *fatty matter*, and a substance which has been named *ergotine.—Ergotine.* When the alcoholic extract of the ergot is acted on by water, this so-called principle is left. It is said to be narcotic and poisonous, and is probably a mixture.—The *fatty matter*, which is dissolved by ether, consists of a liquid, and a solid portion. This is also said to be poisonous, but upon what the peculiar action of the ergot depends, is yet undecided.

Preservation.—Ergot should be preserved entire in well-stoppered bottles. When kept for some months, especially if no precaution of this kind be taken, it becomes attacked by a small species of mite or acarus, which eats all but the exterior. Independently of this, it is affected by mere age, which frequently renders it plump, black, soft, and fœtid.

Operation.—The most obvious effects of the internal administration of ergot, are manifested upon the contractile tissue of the uterus. During its gravid state it can originate contractile efforts, and increases their energy when they have commenced naturally, at the full period of pregnancy. This operation is occasionally accompanied by functional disturbance of the nervous centres, in the form of headache, stupor, or delirium, sometimes by vomiting, colicky pains, or an excited circulation. In an unimpregnated state, it is stated on the one hand to be emmenagogue, and, on the other, to possess the power of restraining an excessive catamenial discharge. The former effect is doubtful, the latter appears well established. It has been believed, on less satisfactory grounds, to be capable of arresting spontaneous hæmorrhages from other surfaces. When long employed, mixed with the food, it either gives rise to a convulsive affection of an acute kind, terminating in coma, and thus manifests its poisonous action upon the nervous centres through their motor and sensory functions, or it occasions a variety of dry gangrene, preceded by more or less fever, and a varied train of symptoms, pointing out a disordered condition of the nervous functions, such as lassitude, vertigo, a sense of numbness or formication in the limbs, with spasmodic contractions of them; the limbs become black, shrunk, and dry, and drop off at the joints.

Uses.—1°. It is principally used during labour, to *increase the*

expulsive action of the uterus; but since many circumstances may arise to retard labour, even where the presentation is natural, and there is nothing faulty in the condition of the child or of the maternal passages, this medicine is not rashly to be administered. When labour is slowly progressing, the evacuation of the bowels, should they be constipated, the avoidance of any thing likely to agitate the mind, and, above all, a due allowance of patience, are often all that is requisite to bring it to a favourable termination. Still, should inertia really exist, the ergot is properly exhibited. 2°. In *nates and foot presentations* the passage of the head through the pelvis is often prolonged, and, in consequence of the mode of delivery, the cord lies beside it, and is subjected to a certain amount of pressure. If this be continued for any time, the child may become asphyxiated; and, accordingly, should the uterus at the time of the passage of the head not appear disposed to act with energy, a dose of the ergot is justifiable.—3°. To *insure uterine contraction after delivery,* and expulsion of the placenta when the uterus manifests a decided tendency to relaxation. Should the placenta, however, be retained or adherent, its removal by the hand is the practice to be adopted, and when hæmorrhage occurs in connexion with this condition, or independently of it, the introduction of the hand commonly arrests it by exciting uterine contraction.—4°. Ergot is used *to procure premature delivery,* which is sometimes an advisable practice, when, from rickets or other cause, the passages are in too contracted a state to allow of the delivery of a living child at the full period. In the pursuance of this method of inducing labour, Dr. Rigby recommends a preparatory purgative and warm-bath, after which scruple doses of the ergot are to be administered every half hour for five or six times. He states that contractions of the uterus rarely fail to follow, and even if we only succeed by this means in producing a slight dilatation of the os uteri, he believes that a state of affairs is brought about in which other means, such as separation or puncture of the membranes, may be more satisfactorily employed than if they had been resorted to at the commencement of the case.—5°. It is used with effect in restraining *passive menorrhagia.*—6°. To stop passive *hæmorrhages from other sources.*

Dose.—Of the powder, grs. xx.—xxx., when administered with

a view to increasing the uterine contractions during labour; in hæmorrhage and for other purposes, grs. v.—x. It is sometimes given in the form of infusion or tincture.

Saccharum Officinarum.—The Sugar-Cane.

Triandria, Digynia.

This plant consists of a tall, smooth, jointed, and solid stem, terminating in a loose, gray-coloured panicle. The leaves are long and flat; and the flowers surrounded by long, soft hairs, and have rose-coloured paleæ.

Hab.—Extensively cultivated in the East and West Indies.

Saccharum. U. S. (*Succus præparatus.*) *L.* Sacchari Fæx. L.

Neither *refined sugar* nor *treacle,* the two officinal articles, require any description.

Manufacture of Sugar.—The canes are pressed between rollers in a mill, and the juice heated with lime in a copper boiler, by means of which its free acid becomes neutralized. It is afterwards evaporated, and crystallizes in grains on cooling. The uncrystallizable part, or *molasses*, is allowed to drain off, and the sugar packed in hogsheads for exportation.

Refining.—Raw sugar is dissolved and clarified by heating with alumina and bullocks' blood, (an albuminous fluid,) and subsequently filtered through animal charcoal. The solution is concentrated in vacuo, and allowed to crystallize in conical vessels, open at the narrow end, which is closed by a piece of paper. After its solidification has occurred, the paper is removed, and the uncrystallizable portion allowed to drain off. The porous mass thus procured is cleared of its remaining colouring matter, by allowing a saturated solution of pure sugar to run through it: the water brings away the colouring matter; while the sugar, taking its place, renders the loaf more solid. The process of *claying*, or allowing water to percolate through clay upon the top of the loaf, is manifestly an inferior mode of effecting the same object. *Treacle* is the uncrystallizable portion obtained from the drainings of the moulds.

Chem. Comp. and Rel.—Cane sugar, when pure, has the formula $C^{12}H^{11}O^{11}$. It is easily converted into grape sugar, $C^{12}H^{14}O^{14}$, either by fermentation, by diastase, or by the action of weak acids. It is converted into mannite by fermentation at a high temperature. *Treacle* consists of an uncrystallizable species of sugar, a substance isomeric with the last.

Oper. and Uses.—Sugar is employed in pharmacy for the preparation of syrups and confections, as well as being a useful medium for administering the volatile oils. When these are dropped upon it, and well triturated, they become miscible with water, such a combination being known as an *oleo-saccharum*. It is, moreover, employed as a vehicle for the administration of powders, and to impart a sweet taste to nauseous medicines.—Treacle is also used as a vehicle for insoluble powders, especially for the sesquioxide of iron, having a tendency to obviate the constipation to which that preparation is apt to give rise. It is a valuable ingredient in pill-masses, having a disposition to keep them from hardening.

Off. Prep.—*Syrupus. L. U. S.* (Sugar, ℔x., [℔ijss., U. S.,] is dissolved in water, Oiij., [Oj., U. S.,] by a gentle heat.)

FILICES.

Nephrodium Filix Mas.—The Male Fern.

Cryptogamia, Filices.

This fern possesses a scaly rhizome, which gives rise to bipinnate leaves, the leaflets being oblong, obtuse, and serrated, and the leafstalk covered with ramenta. The sori are seated near the midrib, and covered with a kidney-shaped indusium.

Hab.—Indigenous. The London College adopts the term *Aspidium* Filix Mas.

Aspidium. (*Radix.*) *L.*

Filix Mas. U. S.

Description.—*Form*, chiefly composed of oblong knobs, which

are the bases of the old leafstalks, and overlap each other, with radical fibres arising from between them. *Consistence*, fleshy, when recent. *Colour*, brown externally, yellowish within. *Odour*, feeble; and *taste*, sweetish, but afterwards astringent and bitter. The rhizomes should be collected between May and September.

Chem. Comp.—The rhizome of the male fern contains a *volatile oil* and resin, to which, probably, it owes its anthelmintic power: besides which, we find *tannic acid;* together with many other ingredients common to all rhizomes, but not possessing any interest to the student of materia medica.

Oper. and Uses.—Male fern is believed to be anthelmintic, and is chiefly useful in destroying the *tape-worm*. However, it would appear that it is most efficacious against a worm which infests the inhabitants of Switzerland and Poland, the *bothriocephalus latus*, and which, resembling the tænia solium in some points of general aspect, differs from it in the segments being broader than they are long, the absence of spines upon the head, and by having two longitudinal fossæ along it, in place of the four suctorial disks of the latter parasite. Its use should be followed by a purgative.

Dose.—ʒj.—iij. It may be given in the form of decoction.

LICHENES.

Cetraria Islandica.—Iceland Moss.

Cryptogamia Algæ.

[The thallus is foliaceous, tufted, cartilagineo-membranaceous, ascending and spreading, lobed and laciniated, olive brown. The apothecia are brown, flat, appressed with an elevated border.]

Hab.—Iceland and the mountainous parts of Europe.

Cetraria. L. U. S.

Description.—It consists of a foliaceous, lobed, smooth, and naked *thallus*, about four inches in *length*. *Colour*, grayish-green. *Consistence*, tough and flexible, but when dry easily [illegible]ed *Odour*, very slight, and *taste* bitter.

Chem. Comp. and Rel.—Iceland moss consists of *cetrarine*,

lichen starch, common *starch*, a trace of *inulin*, *cellulose*, an acid called *lichenic acid*, united with potash, etc.

Cetrarine, a bitter principle extracted by alcohol, coloured blue by strong hydrochloric acid, composition unknown. It usually occurs as a white powder; one pound of lichen furnishes about ℨijß of cetrarine.

Lichen starch differs from common starch, in being coloured yellow by iodine; but both are precipitated by subacetate of lead. Its composition is $C^6 H^5 O^5$.

Inulin.—See Inula Hellenium.

Cellulose.—The basis of the cellular tissue of plants. Formula, $C^{24} H^{21} O^{21}$. It is left after the tissue has been acted on by boiling water and other reagents.

Lichenic Acid, found to be identical with fumaric acid, which is formed by the decomposition of malic acid by heat.

Iceland moss, when boiled in water, first swells up and then yields a substance which gelatinizes on cooling.

Oper. and Uses.—When the bitter matter is not removed, Iceland moss is a mild and useful tonic, but becomes nutritive and emollient when a portion of it has been got rid of by maceration in a weak alkaline solution. It is well fitted for phthisical and dyspeptic cases; and a strong decoction, when flavoured and allowed to gelatinize, constitutes a pleasant article of diet. It has been said to cure ague.

Off. Prep.—*Decoctum Cetrariæ. L. U. S.* (Iceland moss, ℨv. [℥ss. U. S.], boiled down with water, Ojss., and strained.) *Dose*, f℥j.—iv.

Rocella Tinctoria.—The Dyer's Orchil.

Cryptogamia Algæ.

A small dry lichen, of a grayish-brown colour, and the thallus forked and subdivided into many roundish threads.

Hab.—Found on the rocks near the Canaries and the Cape de Verd Islands.

Lacmus. (*Thallus præparatus.*) *L.*

The lichen contains *erythrine*, a neutral crystallizable principle, very soluble in boiling water, alcohol, ether, and alkaline solu-

tions, but slightly in cold water. It is colourless until its alkaline solution is exposed for a time to the air, when it assumes a fine violet tint. *Formula*, $C^{20} H^{13} O^{9}$.

Preparation of Orchil and Litmus.—The plant is exposed to the simultaneous action of the *air* and *ammonia*, obtained from stale urine or from the gas works. The lichen, turned by this means to a violet colour and uncompressed, constitutes *orchil.* Beaten to a pulp and dried in little cubes, it forms *litmus.*

Use.—Paper stained with litmus is employed as a *test for acidity*, being turned of a red colour.

ANIMAL MATERIA MEDICA.

CLASSIFICATION OF ANIMALS YIELDING ARTICLES OF THE MATERIA MEDICA.

The articles of the Materia Medica derived from the animal kingdom are very few, in comparison with those which inorganic bodies and vegetables furnish; still they are sufficiently numerous and varied enough in their source to claim at our hands a a brief consideration of the zoological arrangement connected with them.

The animal kingdom, separated from the vegetable, by a more or less definite line, presents to the view of the student two great and important divisions, founded, not so much on external characteristics, as on circumstances of anatomical structure. That which we justly regard as the inferior of the two, although containing very far the greater number of individuals, is distinguished by the imperfect developement of the nervous system, and the absence of those higher instincts which accompany a more elevated position in the scale of creation. It is called *Invertebrate*, from the absence, in the animals it embraces, of a vertebral column in the form of a canal, enclosing the central organs of the nervous system. The other is known as the *Vertebrate*, including all the higher forms of animal existence, and crowned by the human species. The animals it includes possess a more perfect developement of the nervous system, having a brain enclosed in an osseous case, and a spinal cord contained in a canal formed by an articulated series of bony pieces. They manifest instincts much more elevated than those of invertebrated animals, though varying in this particular, in accordance with the similarity which their nervous system bears to that of man. Animals which, like the *sponges*, assimilate most

closely to vegetable growths, *worms, insects, mollusca*, etc., belong to the former of these divisions; while *fishes, reptiles*, and the hot-blooded animals, namely, *birds* and *mammalia*, constitute the latter.

With the exception of the *reptilia*, the classes above enumerated afford articles which are employed in medicine; and we shall therefore proceed to a very short outline of the characters by which each may be distinguished, and their medicinal orders separated from one another.

Invertebrata.

Cl. Poriphera.—Aquatic animals, composed of a gelatinous flesh, enclosing a horny, calcareous, or siliceous skeleton. They are fixed in the adult condition, and characterized by the possession of canals ramifying throughout their texture, and opening by means of large and small pores upon their surface: through these, a continual circulation of water is being carried on.

Cl. Annelida or Red-blooded Worms.—They are characterized by the elongated form of their bodies, which are enclosed in rings, by the possession of a double and often gangliated nervous cord running along the ventral aspect of the body, together with the absence of wings and articulated members. They inhabit both the water and the earth, sometimes breathing by branchiæ and at other times by means of air sacs.

Cl. Insecta.—These are invertebrated animals, possessing a division into three parts (*in . . . secta*), namely, head, thorax, and abdomen. They have six legs, and mostly possess wings, both of which are attached to the thoracic segment. A further character is, that they breathe by tracheæ or tubes ramifying throughout the entire texture of their body, and that they undergo a metamorphosis.

Order *Coleoptera.* — Possessing a pair of wings covered by wing-cases or *elytra*, and having a mouth with mandibles and maxillæ.

Order *Hemiptera.* — Possessing a pair of wings and also wing-cases, the proximal half of which is mostly coriaceous, while the distal is membranous: sometimes the elytra are more similar to wings, but thicker and more extended. The lips,

mandibles, and maxillæ are modified to an articulated sheath containing four setæ.

Order *Hymenoptera.*— Possessing four naked, veined, and unequal wings, and a mouth with distinct jaws, mandibles, and lips.

Cl. Conchifera.—These are acephalous mollusca, enclosed in a bivalve shell, and breathing by means of two pairs of pectinated branchial laminæ, lying next to the mantle.

Vertebrata.

Cl. Pisces.—Cold-blooded aquatic vertebrata, breathing permanently by gills alone, being oviparous, and having the pectoral and sacral extremities in the form of fins.

Cl. Aves.—Hot-blooded oviparous vertebrata, respiring by lungs *not* enclosed in a distinct thoracic cavity, but contained in the thoracic and abdominal regions, and fixed to the sides of the trunk. The anterior extremities are modified into the form of wings, and the body is clothed with feathers.

Cl. Mammalia.—Warm-blooded animals, which respire by lungs enclosed in a distinct thoracic cavity, producing their young alive, and provided with mammæ for the secretion of milk, by which they are nourished during the earlier periods of their growth.

Order *Cetacea.*—Aquatic mammiferous animals, having a fish-like body, and a tail extended horizontally. They are destitute of legs, but have anterior extremities modified into the form of fins.

Order *Pachydermata.*—Thick-skinned herbivorous quadrupeds, destitute of clavicles, and which do not ruminate.

Order *Ruminantia.*—Herbivorous quadrupeds, which subject their food to the process of rumination, and, accordingly, possess four stomachs, two having relation to the food previous to this act, and two subsequently.

Order *Rodentia.*—Non-ruminant animals, feeding on roots, wood, and the coarsest sort of vegetable nutriment. They are characterized by the possession of rodent or chisel-shaped incisors, both in the upper and lower jaw, which do not cease to grow, like the incisor teeth of other animals.

MAMMALIA.

Order *Rodentia.*

Castor Fiber.—The Beaver.

This animal inhabits Canada and the northern parts of Europe.

Castoreum. U.S. (*Concretum in folliculis præputii repertum.*) *L.*

Description.—Castor is a product both of the male and female beaver, being contained in two *follicles* or *sacs* placed beneath the skin near the pubes, possessing *several coats*, one of which is *muscular*, as if with a view to the expulsion of their contents. They open, in the *male*, by a common aperture into the *præputial canal;* and in the *female*, by two apertures in front of the *vagina*, common to them and to an *oil sac* on either side. It is semifluid during life, but becomes *solid* subsequently to its removal from the animal, and possesses a strong peculiar *odour*, and a bitter sub-acrid *taste*. It is imported in the sacs. There are two varieties known in commerce, and recognised by the form of the sacs and the colour of their section. 1°. Russian.—*Form* of the sacs, roundish, smooth externally. *Section*, of an orange-colour. 2°. Canadian.—*Form* of the sacs, oblong, thin, and corrugated. *Section*, of a deeper colour than the Russian. Of these varieties the first is the finest, but the latter the more common.

Chem. Comp.—Castor contains a neutral fatty principle called *castorine*, a *volatile oil*, *resin*, *cholesterine*, with animal matters and salts, as carbonate of lime, in large quantities, which are of little interest. Any mėdicinal power which it may have, probably depends on the volatile oil and resin.

Oper. and Uses.—Stimulant and antispasmodic, and has been given in *spasmodic diseases*, such as hysteria, epilepsy, etc. It is of little value, and its use accordingly is almost exploded.

Dose.—℈j.—ij.

Off. Prep.—*Tinctura Castorei. L. U.S.* (Powdered castor, ℥ijss., [℥ij., U.S.], macerated in rectified spirit, Oij., and strained.) *Dose*, f℥ß—ij.

Order *Ruminantia.*

Moschus Moschiferus.—The Musk-Deer.

An animal inhabiting Thibet, China, and Siberia, distinguished from the deer by not possessing horns, but having canine teeth in place of them in the upper jaw of the males.

Moschus. U.S. (*Humor in folliculo præputii secretus.*) *L.*

Source and Nature of Musk.—Musk is the secretion of a sac, found only in the male animal, lying upon the abdominal parietes, covered only by the skin, and opening by a *small aperture* upon its surface, just in front of the *præputial orifice.* The sac itself possesses *several coats,* and is surrounded by *muscular fibres,* a provision for the expulsion of its contents. The secretion itself appears intended, by its powerful odour, to attract the female and direct her to the male, and accordingly is only found in adult animals, and most abundantly during the rutting season. The musk is exported in its sacs.

Description.—The pods, as met with in commerce, are of an oval *form,* flat, and naked upon the side which was next to the abdomen, but convex and covered with stiff hairs upon the other, which are arranged concentrically round the orifice of the sacs. Their inner membrane is plaited, and the remains of the penis may constantly be discovered on examination of the pod. Musk itself is granular and rather unctuous, possessing a brown *colour,* an almost peculiar *odour,* and a bitter, acrid *taste.* There are two varieties found in commerce.—1°. China or Tonquin, which is the most valuable, and distinguished by the reddish or cinnamon colour of the hair. 2°. Russian or Kabardine, which is less prized, and known by the greater length and whiter colour of the hair upon the pods.

Chem. Comp.—Musk contains traces of a *volatile oil* and free *ammonia;* besides which we find *fatty bodies, cholesterine,* gelatinous and albuminous matters, a fibrous tissue, with impurities, as sand, hair, etc.; and salts, as carbonate and phosphate of lime, chlorides of sodium, potassium, and calcium. The odour of musk

has been said not to depend on the volatile oil, but probably is the result of a decomposition of some ingredients of the musk, for ammonia appears evolved at the same time; and, as Robiquet suggests, perhaps the ammonia may cause the odorous principle to become volatile.

ADULTERATION.—*Dried bullock's blood,* with the addition of a little ammonia, and some musk to impart to it the correct odour, is occasionally passed off as a genuine musk. It is detected by *bi-chloride of mercury* precipitating its infusion, while it has no effect on that of real musk.—*False musk pods* are easily recognised by the absence of the aperture, and of the concentric arrangement of the hairs.

OPER. AND USES.—Musk is stimulant and antispasmodic, sometimes, however, inducing headache and nausea. Its odour becomes perceptible in all the excretions. It is sometimes used in the *typhoid* stage of *continued and exanthematous fevers,* accompanied by subsultus tendinum, low delirium, etc. In the typhoid form of *pneumonia* it has been recommended almost as a specific. A variety of *nervous symptoms* included under the term of hysteria, or arising independently of that constitution, such as hiccup, nervous palpitation, intestinal spasms, etc., sometimes obtain relief from its exhibition.

DOSE.—Grs. v.—xv.

OFF. PREP.—*Mistura Moschi. L.* (Musk, ʒiij., is rubbed with sugar and powdered acacia, each, ʒiij., and then with rose water, Oj., added in small quantities at a time.) *Dose,* f℥ß—ij.

OVIS ARIES.—The Sheep.

SEVUM. U. S. (*Sevum.*) *L.*

The officinal suet, is the fat which surrounds the kidneys of this animal. Before being used in the preparation of ointments, it requires to be melted and strained.

CHEM. COMP.—Mutton suet consists chiefly of *stearine,* with a little *oleine.*

OPER. AND USES.—As lard.

Cervus Elaphus.—The Stag.

Cornu (*Cornu*). *L.*

Hartshorn is found in the shops in the form of shavings, formed by shaving down the inner white part of the horn.

Chem. Comp.—Hartshorn shavings have the same composition as *bone*, and consist, therefore, of *gelatine*, with *phosphate of lime*, and a trace of the *carbonate*. The decoction is simply a solution of gelatine.

Oper. and Uses.—Hartshorn made into a decoction, is nutritive from the gelatine which it contains, but is otherwise of no value whatever.

Off. Prep.—*Cornu Ustum. L.* (Hartshorn shavings are burned in an open vessel until they become white: they are then powdered, and prepared as directed for chalk.) A preparation rarely if ever employed at present. *Dose*, grs. x.—ʒj.

Order *Pachydermata.*

Sus Scrofa.—The Hog.

Adeps. U. S. (*Adeps præparatus.*) *L.*

The fat which surrounds the kidneys is especially fitted for the preparation of lard. It is melted, and strained through linen; and then allowed to solidify in bladders. As found in the shops, it mostly contains salt, which must be removed by melting, and washing carefully with boiling water.

Chem. Comp.—Pork lard is composed of *margarine* and *oleine*, and perhaps a little *stearine.*

Oper. and Uses.—It is used in the preparation of ointments. It is sometimes added to a bread poultice, in order to prevent its becoming hard; and is commonly employed as a dressing for blisters, in place of spermaceti ointment.

Order *Cetacea.*

Physeter Macrocephalus.—The Sperm Whale.

Hab.—The Pacific Ocean, and the Indian and Chinese Seas.

Cetaceum. U. S. (*Concretum in propriis capitis cellulis repertum.*) *L.*

How obtained.—The spermaceti of commerce is obtained from a peculiar structure situated above the upper jaw, and consisting of two cavities, one superior to the other, each being divided into a considerable number of cells. The upper furnishes the finest spermaceti. Their contents are fluid during the lifetime of the animal; and, after being removed by buckets, the spermaceti solidifies as the liquid cools; and, the oil mixed with it being drained off, the solid portion is submitted to strong pressure. It is subsequently purified by fusing and skimming, and then re-melting it in a weak potash ley. After this, it is fused by itself, and allowed to crystallize.

Description.—*Form*, crystalline plates. *Colour*, white and pearly. *Consistence*, soft, brittle, and unctuous. *Odour* and *taste*, none.

Chem. Comp.—Pure *spermaceti*, when freed from the little *oil* with which it is usually combined, consists of a substance called *cetine*, which is obtained by dissolving spermaceti in alcohol, when the pure cetine is deposited on cooling, and the oil held in solution by the spirit. It melts at 120° F., sublimes at 670° F. Fused with potash, it yields an *oleate* and *margarate* of that base, and about 40 per cent. of a substance called *ethal;* which is a crystalline body, insoluble in water, but soluble in alcohol and ether, fusing at 118° F., having the composition $C^{32} H^{34} O^{2}$: or it may be represented as the hydrated oxide of a radical, called *cetyle* ($C^{32} H^{33}$); with the *formula* $C^{32} H^{33} O + H O$. Dumas considers *spermaceti*, or *cetine*, to contain 2 atoms of margaric acid, 1 atom of oleic acid, and 3 atoms of ethal, or oxide of cetyle. The ethal taking the place of glycerine in ordinary fats; but this is doubtful.

Oper. and Uses.—Spermaceti is emollient, and was formerly

used in catarrhal mixtures, but is rarely employed now, except in the preparation of ointments and cerates.

Off. Preps.—*Ceratum Cetacei. L. U.S.* (Spermaceti, ℨij. [ℨj. U.S.] white wax, ℨviij., [ℨiij. U.S.] are melted together, and olive oil, Oj. [fℨvj. U.S.] being added, the whole is stirred till it is cold.)

Unguentum Cetacei. L. (Spermaceti, ℨvj.; white wax, ℨij.; olive oil, fℨiij. Melt over a slow fire, and stir until cold.) This and the above are used for dressing blisters, and for other purposes.

Oleum Jecoris Aselli. *Cod-Liver Oil.*

Phys. Prop.—It is usually met with in the shops as a more or less deeply coloured oil, about the thickness of train oil, having a nauseous fishy taste and odour, but which is not disagreeable to some individuals, especially children, who frequently take it very readily. A paler and purer variety is in use on the Continent.

Preparation.—Some allow the livers of the cod-fish to putrefy in a perforated cask, exposed to the sun, the oil being collected in vessels placed below to receive it. Dr. Pereira states that another method sometimes employed is to boil the livers of the fish.

Chem. Comp.—Cod-liver oil resembles very much the other animal oils in composition, having for its basis *oleine* and *margarine*, and dissolved in these we find various substances, such as choleic acid and the products of its decomposition, butyric and acetic acids, the colouring matter of bile, and various salts, containing iodine, bromine, chlorine, sulphuric and phosphoric acids, united with lime, soda, potassa, etc., as well as free phosphorus. Copper has also been said to be detected in it.

Oper. and Uses.—Cod-liver oil has long been in use as a popular remedy in Holland and the North of Germany, but of late years its value has been tested by medical men both on the Continent and in this country. When swallowed, it frequently gives rise to nausea and is vomited; an effect resulting, in all probability, from its nauseous taste, and some persons being unable to retain oils on their stomach at all. At all events, with the exception of the disappearance of certain diseased states under its

use, there is no ground for believing that it exerts any very decided influence over the secretions and functions generally. The diseases which have appeared to be benefited by its use, are the same as those for which iodine is commonly prescribed; and it is to this element that it is believed to owe its efficacy. *Scrofula* and *rickets, chronic rheumatism*, chronic *diseases of the bones and joints, obstinate skin diseases*, and, of course, the opprobrium medicinæ *phthisis*, are the principal for which it has been recommended, and said to have proved useful. As regards the last, we cannot help noticing how well it corresponds with Liebig's notion of the excess of oxygen in that disease, as well as in others accompanied with rapid emaciation. But, be this as it may, the continued use of cod-liver oil is said to be accompanied by an improvement in the *embonpoint* of the individual. Not having given the remedy a fair trial in any of these cases, we can offer no opinion on its importance.

Dose.—ʒß—jß, three times a-day.

AVES.

Phasianus Gallus.—The Domestic Fowl.

Ovum. L.

The common hen's egg scarcely requires description with a view to its medicinal value.

Chem. Comp.—The *yolk* of the egg (*vitellus*) consists of a *proteine compound*, united with *fatty matter* and water. The *proteine compound* has been found by Mulder to be a sulphuret of the binoxide of proteine, $C^{40}H^{31}N^{5}O^{14}$ + sulphur. The *fatty matter* consists of a yellow oil, containing phosphorus, in a state of unknown combination, and a small quantity of a crystallizable and non-saponifiable fat, similar to cholesterine.

The *white* or albumen ovi, is a watery solution of albumen, of which it contains about 13 per cent., with a small proportion of salts, as chloride of sodium, phosphate of lime, etc. The albumen has the same composition as that of fibrine, viz.—10 $(C^{40}H^{31}N^{5}O^{12})+S+P\frac{1}{2}$, and can be distinguished from the albumen of blood by being coagulated by ether.

The *shell* (testa ovi) consists chiefly of carbonate of lime, with small quantities of the phosphate of lime and magnesia, and a little animal matter.

Oper. and Uses.—Yolk of egg is used in the preparation of emulsions and liniments, suspending the oils which enter into their composition. The albumen is an antidote for *poisoning* by bi-chloride of mercury, and sulphate of copper, and is administered to sheath the mucous membrane in other forms of acrid poisoning.

CONCHIFERA.

Ostræa Edulis.—The Common Oyster.

Testa. U.S. (*Testæ.*) *L.*

Oyster shells might be very advantageously expunged from the list of the London College, since prepared chalk is applicable to all the purposes for which they have been employed. *Carbonate of lime* is their active ingredient.

INSECTA.

Order *Coleoptera.*

Cantharis Vesicatoria.—The Spanish Fly.

Hab.—This insect inhabits every part of Europe, where the vine flourishes naturally, being found on plants of the orders oleaceæ and caprifoliaceæ.

Cantharis. L. U.S.

Description.—The *length* of the insect is from 6 to 10 lines. It possesses *elytra* of a shining green colóur, and has a longitudinal furrow along the head and chest.

Collection, etc.—The time for catching them is the period of their copulation, in the month of May, when the trees which they frequent are beaten with poles, or shaken, so that the insects may fall upon sheets, which are spread below to receive them. They are collected when torpid in the evening or morn-

ing, and the persons engaged in it are compelled to protect their faces and hands with masks and gloves. The insects are killed by immersion in vinegar, or by exposing them to the vapour of vinegar, or oil of turpentine.

Preservation.—When long kept, cantharides are apt to be attacked by mites, and, with a view of preventing this, they should be preserved in well-stopped bottles, a few drops of acetic acid being added to them. Dr. Pereira has found the latter "a most successful mode of preservation."

Chem. Comp.—Cantharides owe their vesicating properties to a principle called *cantharidine*, besides which the insects contain *a green oil, fatty matter*, and other constituents possessing no nterest; also a trace of *uric acid.*

Cantharidine occurs, when pure, in small crystalline plates resembling *mica*, fuses when heated into a yellow oily liquid, and volatilizes. *Cantharidine* is neutral in its reactions, insoluble in cold water and alcohol, when separated from the yellow matter with which it is combined in the insect, and which seems to be the cause of its solubility in these fluids when they are digested upon the Spanish flies. Cantharidine possesses a most intensely irritating power; the smallest particle will raise a blister, and the vapour acts powerfully upon the eyes, nose, and organs of respiration; it can be applied, dissolved in almond or any other fixed oil. The composition of cantharidine can be represented by the *formula* $C^{10} H^6 O^4$.

Adulteration.—Mr. Mackay has noticed the adulteration of the flies with variously coloured glass beads, to the amount of more than three ounces in a pound weight of the cantharides. The golden beetle, *cetonia aurata*, is sometimes mixed with it on the continent. Powdered Spanish flies are sometimes adulterated with the powder of *euphorbium.*

Operation.—Externally the Spanish fly is powerfully rubefacient, and if its application be continued, vesicant; sloughing may result in low states of the constitution, such as are present in typhus, and after exanthematous fevers, especially measles.—Internally, it is stimulant and diuretic, and if its use be continued too long or the dose be too large, its operation may be accompanied by strangury or hæmaturia; occasionally excitement of the sexual feelings is induced. It appears also to act as a stimu-

lant upon the nervous centres, aiding the restoration of the motor power in limbs affected with chronic paralysis. When taken in sufficient quantities to prove poisonous, it gives rise to symptoms of severe gastro-enteritis and disorder of the nervous system. There are incessant vomitings, tormina and bloody purging, with difficult micturition, and the urine is either very much diminished and bloody, or entirely suppressed. Burning pain and a sense of constriction in the throat are common accompaniments; but the excitement of the sexual organs is subject to considerable variation. Convulsions and delirium commonly precede death.

Uses.—Where it does not stimulate the kidneys too much, it is very useful as a diuretic in *albuminuria*, after the congested condition of the organs has been relieved by topical depletion, hydragogue purgatives, and diaphoretics. As in the case of other diuretics, given in this stage of the disease, its use must at once be abandoned should the quantity of urine not be increased, or the albumen it contains diminished. When acting favourably, any slight *dropsy* that may remain often disappears under its use.* It is a useful remedy for *incontinence of urine*, such as occurs to children during sleep. In *paralysis*, the indications for its use are the same as for strychnia. Chronic *eczema*, *lepra*, and *psoriasis*, appear often to be benefited, and sometimes cured by its judicious use. In the last place, it is recommended in *hydrocephalus*, where the stage of effusion is fully established: children have been known to recover from profound coma under its use, when all the other ordinary remedies had proved ineffectual: for this purpose, it has been successfully prescribed by Dr. Merriman and Dr. Williams, (*MS. Notes of Lectures.*)

The preparations of cantharides are used externally as rubefacients, under similar circumstances with other remedies of the class; but their most important application is for the elevation of a blister.

Dose.—Grs. ½—ij.

Off. Preps.—*Tinctura Cantharidis. L. U. S.* (Bruised cantharides, ℨiv., [ʒj., U. S.,] macerated in proof spirit, Oij., and strained.) This is a good preparation for internal use; and may

* For further information on this head we would refer the reader to Dr. C. J. B. Williams's *Principles of Medicine*, pp. 154 and 191.

be given in any demulcent infusion or decoction. It may be advantageously combined with a little tincture of henbane to diminish its irritant operation, when the latter is not contra-indicated. *Dose*, ♏xv., gradually increased.

Acetum Cantharidis. L. (Powdered cantharides, ℥ij., are macerated in acetic acid, Oj., and the liquor expressed and strained.) Used as a rubefacient and vesicant.

Ceratum Cantharidis. L. (Finely powdered cantharides, ʒj., mixed with ceratum cetacei, ʒvj., softened by heat.) Used for the purpose of keeping up a discharge from a blistered surface.

Unguentum Cantharidis. L. U. S. (A strained aqueous decoction of cantharides, made of cantharides, ʒj., [℥ij., U. S.,] and water, f℥iv., [Oss., U. S.,] reduced to one half, mixed with ceratum resinæ, and evaporated to a proper consistence.) Used as the preceding.

Emplastrum Cantharidis. L. (Plaster of wax, ℔jss., and lard, ℔ss., are melted together, and, just before they concrete, powdered cantharides, ℔j., are sprinkled in and mixed with them.) This is the common plaster, which is used for the purpose of raising a blister. [The *Ceratum Cantharidis, U. S.*, is very similar to this: it is, cantharides, ℔j., yellow wax, resin, and olive oil, each, ℥viij. To the latter, melted together, add the cantharides, and stir till cold.] In respect to its preparation, Dr. A. T. Thomson remarks, that there is great waste of the powdered insect, as only those particles which are upon the surface are of use. It would be much better, in his opinion, "were some kind of semi-adhesive paste contrived for forming the basis of the plaster, upon which the powdered cantharides could be sprinkled before applying the plaster to the skin." (*Elements of Materia Medica.*) Blisters are employed either in the treatment of internal *painful and inflammatory diseases*, or for the cure of some chronic and *obstinate diseases affecting the skin* itself, where a powerful stimulant of this nature frequently produces most beneficial results. Their most ordinary use, however, is as counter-irritants; but it is of great importance to bear in mind the stage of the *inflammatory diseases* in which they may be applied. The principal point to be attended to is, that there should be little or no inflammatory fever present, for, should it not have been previously subdued by antiphlogistic measures, it would only be

aggravated by the application of a blister. Hence it is, that blisters are employed after some of the activity of the disease has subsided, and the constitutional excitement which accompanies it has been calmed. In *chronic inflammations*, where the fever is slight and not continuous, they may be had recourse to at once with advantage. The *effusions* which occur into the serous cavities after inflammation, frequently disappear under repeated blistering. In many of these cases, it is desirable that the surface vesicated should be large, and the blisters must be made, accordingly, of corresponding dimensions. They are sometimes applied to the calves of the legs, or feet, as revulsives in the *coma* of apoplexy, etc. Some *neuralgic affections* are relieved by blistering near the painful part, as in toothache, earache, pleurodynia, etc. Their use in *rheumatism* has been made subject of doubt; but, after the activity of the fever has been abated, they frequently prove eminently successful, especially in the *gonorrhœal* and neuralgic forms. The stiff joints, which sometimes result from chronic rheumatism, may occasionally be recovered by repeated blistering, if this state have not been of too long duration. They are equally useful in other inflammatory *diseases of the joints.*

Some individuals, who are very susceptible of the influence of cantharides, are affected with strangury from the use of blisters; and, when this is the case, a layer of tissue-paper may be advantageously interposed between the blister and the surface of the skin. After vesication has been produced, the plaster is to be removed, and the serum having been allowed to escape by snipping the cuticle, the surface is generally dressed with spermaceti ointment, or an emollient poultice is applied. When it is desired to keep up a discharge, the ceratum sabinæ, or the unguentum or ceratum cantharidis, may be used as the dressing.

Their *application to children* under four years of age requires considerable caution; and the more, the younger the infant. The plaster should be diluted with simple cerate, and not allowed to remain on longer than to produce redness of the surface: the blister will often be found risen on removing the first dressing. In very young infants, it has appeared to us doubtful whether even redness should be permitted to occur before its removal. The danger with these little patients lies not so much in its injurious influence on the constitution, as in the violence of its topical

effects, leading to intense inflammation, sloughing, and death. When these unfavourable events appear about to ensue, the surface will require constant attention and the use of emollient poultices, while the constitution is preserved from sinking by the judicious use of nutriment and stimulants.

Order *Hemiptera.*

Coccus Cacti.—The Cochineal Insect.

Hab.—This insect is an inhabitant of Mexico, being chiefly found upon the *Opuntia cochinillifera.*

Coccus. L. U.S.

Description.—*Form*, roundish, convex on one side, flat and a little hollow upon the other, wrinkled. It is about one or two lines in *length;* of a grayish *colour*, with a white bloom of fine down between the rings; an inferior kind is purplish-black and without bloom. *Taste*, warm and bitterish.

Collection.—The insects are carefully reared upon plantations of the opuntia cochinillifera, and are collected at different seasons. The impregnated females are alone taken at the first harvest, but, in the succeeding, the young insects also and the skins, neither of which are of much value. They are killed by immersion in boiling water, and subsequently dried in the sun or by a stove.

Chem. Comp.—This insect contains, besides the ordinary animal matters, fatty bodies, and salts common to insects, a colouring matter which has been called *cochenilline* or *carmine*, which is obtained by digesting the insect first in ether to separate the fat, and then in alcohol, which dissolves the colouring matter. It occurs, when pure, in crystalline grains of a beautiful purplish-red colour, is soluble in water, and the solution is turned violet by alkalies, crimson by albuminous salts, and carmine and scarlet by tin. It contains a small quantity of nitrogen.

Adulteration.—By giving an inferior cochineal a downy appearance by shaking it with *powdered heavy spar* (sulphate of baryta) or talc, so as to fill its furrows with it, attempts have been made to pass it off as the finer (silver) variety, but a magnifying

glass will readily unveil this imposition. It has been discovered to be at times still more adulterated, by moistening the insects with gum-water, and then agitating them with powdered heavy spar so as to increase their weight, and subsequently with ivory black.

Oper. and Uses.—Cochineal is chiefly used as a colouring matter. It has been, at various times, extolled as a remedy for *hooping cough.*

Order *Hymenoptera.*

Apis Mellifica.—The Honey Bee.

Mel. U. S. (*Humor è floribus decerptus et ab ape præparatus.*) *L.*

How obtained.—Honey is sucked by the bee from the nectaries of flowers, and collected in the *crop* or *honey bag*, from which it is discharged, slightly altered, on its arrival at the hive. It is obtained for medical use from the honeycomb, by dripping the flakes in the sunshine.

Chem. Comp.—Honey consists chiefly of *sugar*, together with mucilage, colouring and odorous matter, a little wax, and frequently a free acid, probably arising from fermentation. The sugar is similar to grape sugar $C^{12}H^{14}O^{14}$, but a portion is not crystallizable.

Adulteration.—*Flour* is not unfrequently mixed with honey: if present it may be detected by iodine. The London College directs that it shall not be used without being despumated: this is effected by melting in a water bath and removing the scum as it rises.

Oper. and Uses.—Honey is demulcent, nutritive, and slightly laxative. It may be used as a vehicle for the administration of powders.

Off. Prep.—*Oxymel.* (Honey, ℔x., is heated and mixed with acetic acid, Ojss.) Sometimes prescribed in catarrhal coughs. *Dose,* ʒj.—℥j.

Cera (*Concretum ab ape paratum.*) *L.* Cera Alba. U. S. (*Idem dealbatum.*) *L.*

How obtained.—Wax is a secretion from the body of the bee, discharged upon the scales which cover the abdomen. Of this they form the comb, which, after the honey has been extracted, is fused in boiling water, and then constitutes *yellow wax.* In the process of bleaching, the crude article is drawn into ribbons and exposed to the air and light for one or two weeks. After remelting, this exposure is repeated, and, last of all, it is melted in water acidulated with sulphuric acid.

Description.—The crude *yellow wax* occurs in yellow masses, of a peculiar odour, but the *bleached* wax is in the *form* of circular cakes of a white *colour*, solid and brittle *consistence*, with no *odour* and very little *taste*.

Chem. Comp.—Wax is composed of two substances; one called *cerine*, the other *myricine.*

Cerine is separated from wax by means of hot alcohol; in which it is very soluble, and is deposited in fine needles on cooling. By the action of potash it is *partly* saponified, yielding a soap containing margaric and oleic acids; but a large portion, about 56 per cent., remains unsaponified, called *ceraine*, similar in composition to myricine.

Myricine, the portion of wax left after the separation of *cerine.* Soluble in about 200 parts of alcohol, and not saponifiable.

In wax, the proportions of *myricine* and *cerine* vary. The composition of these bodies has been represented by Van der Vliet, as follows:

Myricine	$C^{20} H^{20} O$
Cerine	$C^{10} H^{10} O$

Adulteration.—*Starchy matters* are detected by iodine: *tallow* is at once recognised by the disagreeable odour emitted when wax is melted.

Oper. and Uses.—Wax is emollient. It has been internally administered by the mouth and by injection in *diarrhœa* and *dysentery*. Externally, it is used as an ingredient of plasters, cerates, and ointments.

Off. Prep.—*Emplastrum Ceræ. L.* (Wax and suet, each ℔iij., are melted with resin, ℔j., and strained.)

Ceratum. L. (Four fluid-ounces of olive oil mixed with four ounces of melted wax.)

ANNELIDA.

Hirudo Medicinalis.—The Medicinal Leech.

Although the *English* or speckled leech is the only one made officinal by the London College, the *Hungary* leech is also imported, and much used for medicinal purposes. These two species have been called by Savigny, *Sanguisuga medicinalis* and *S. officinalis.*

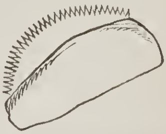
These leeches have a soft and extensile body, composed of very numerous rings, narrower towards the mouth than towards the tail, and terminating at each extremity in a muscular disk, of which the anterior is the smaller. Their length varies with their degree of extension. They have six longitudinal rusty-red stripes along their back. In the *S. medicinalis,* or speckled leech, the back is of an olive-green colour, and the stripes are mostly spotted with black; while the belly is of a greenish-yellow colour, and also spotted. In the *S. officinalis,* however, the back is of a paler colour, and the stripes and belly are both unspotted.

Hab.—The *S. medicinalis* is a native of Britain and the northern parts of Europe. The *S. officinalis* is found in the South of Europe. Both varieties are imported from Hamburg; and the latter, in addition, from Lisbon and Bordeaux.

Hirudo.

Collection.—The persons who collect leeches, walk into the ponds where they exist, and allow them to fix upon their naked legs. Sometimes baits or nets are employed for the purpose.

Description of the Digestive System.—The *mouth* of the leech, situated upon the face of the anterior and minor disk, is triradiate, "and is armed with three crescentic *jaws,* presenting their sharp convex margin towards the oral cavity, which margin is beset with sixty small teeth." "The



Jaw of the Leech.

Plan of the Alimentary Canal of the Leech.

œsophagus (*a*) is short, and terminates in a singularly complicated *stomach*, divided by deep constrictions into *eleven compartments* (*b*), the sides of which are produced into *cæcal processes* (*c*) progressively, though slightly increasing in length to the tenth, and disproportionably elongated (*d*) in the eleventh compartment. The first gastric chamber is the smallest. In the eight posterior compartments the anterior part of each slightly expands to form a pair of small accessory cæca. The middle part of the eleventh division extends backward in the form of a small funnel-shaped process, and opens into the commencement of the slender *intestinal canal* (*e*); this is seated between the two last and longest gastric cæca; it terminates by a small *anus* above the terminal sucker." (*Owen's Lectures on Comp. Anat.*, etc.)

Mode of Drawing Blood.—The leech first renders the skin tense by fixing the anterior disk, and then divides it by a saw-like motion of its jaws, which are protruded through the mouth for this purpose, so as to give rise to a triradiate wound. The blood is drawn by suction and swallowed, the process being continued until the stomach and its cells are fully distended, when the leech falls off. The average quantity drawn is fʒij., but this does not include what flows subsequently into the poultices, etc. employed. The Hungary leech is believed to draw considerably more than the speckled variety.

Application.—The most active leeches should be chosen, which are known by their contracting into a ball, when a handful taken out of the jar is gently pressed. They ought not to be applied for an hour or two after removal from the water. The best method of fixing them is to cleanse the part thoroughly, and, after wiping the leeches quite dry in a soft cloth, to place them on enclosed in a small pill-box, or covered with a clean

towel. When it is desired that they should attach themselves at one particular spot, a leech-glass may be used. It should be recollected that the vapour of sulphur or vinegar, or the fumes of tobacco in a room, will often effectually prevent their biting at all. After a leech has fallen off, the blood which it has taken, should be gently and gradually squeezed from it by the mouth, and afterwards it should be placed in a jar of clean water, which it will be necessary to change for a short time twice in the day. The practice of putting salt upon the head with a view to compelling the leech to disgorge the blood, is objectionable. It has been stated that a little white sugar added to their water renders them fit to use again after an interval of three days. We have found a few drops of vinegar used in the same way more effectual.

Management of the Leech-bites.—This will vary according as it is desired to encourage or to stop the bleeding. To *encourage it,* a poultice or warm fomentations, or a succession of dry warm napkins may be applied. *For stopping it,* exposure to the cold air is mostly sufficient, but should it not be so, compression may be used. Occasionally, however, much greater difficulty is experienced, and the hæmorrhage sometimes becomes alarming, especially when children are the subjects of it. One of the best plans to put in practice when ordinary means fail, is to dry the cavity of the bite by a portion of lint, introduced at the end of a needle, and then to cauterize it by means of a fine point of nitrate of silver, giving it a turn in the wound. A valuable rule is, never to apply leeches to an infant towards evening, unless quite unavoidable, lest hæmorrhage should continue unchecked through the night; many children have been lost by a careless neglect of this simple precaution. Another important point to keep in mind with regard to them is, that leeches should be placed, in all cases, over some resistant part, against which pressure, if necessary, may be made.

Operation and Uses of Leeching.—Leeching may operate in three ways:—1. As a *general depletive;* 2. As a *local depletive;* 3. As a *counter-irritant.* Its *first operation* is not often seen in adults, unless they be very delicate, and the number of leeches be very great. However, for *children* they are commonly used

with a view to this effect, being applied in young infants upon the hand or foot, situations where the consequent bleeding may be readily commanded. But the *second mode of their operation* is that for which they are most highly valued, and most frequently employed. In *local congestion* or *inflammation*, they draw blood directly from the distended vessels, or from others in communication with them; so that they become enabled, by removal of pressure from within, to contract upon their contents, and assume the condition most favourable to circulation through them. Still we cannot expect so advantageous a result to follow, when there exists, in addition, an exalted state of the heart's action, with a plethoric fulness of the sanguiferous system generally: these will require both the previous use of the lancet, and the administration of sedative medicines.—In considering the comparative efficacy of *cupping* and *leeching*, as means of topical blood-letting, it must be kept in mind, that while the former is perhaps a more rapid and forcible mode of abstraction, the latter is applicable to situations where cupping-glasses would be inconvenient, or even impossible to be placed; the tonsil, testicle, anus, etc., are some of these. In other cases, again, of external inflammation, or where a similar condition is manifested in internal organs, the tenderness of the part is often so extreme, as to render the weight of the glasses insupportable; a condition which prevails often in inflammation of the peritoneum and abdominal organs, of the liver, pericardium, pleura, etc., as well as in the advanced stages of pulmonary consumption. Their *counter-irritant action* is merely supplemental to the two former.

PORIPHERA.

Spongia Officinalis. *Officinal Sponge.*

Sponge is the horny skeleton of a poripherous animal found attached to the submerged rocks in the Red Sea, Mediterranean, etc. It occurs in masses of varying size, but presenting on its surface the large and small pores which characterize the class. The skeleton is reticulated and elastic, and in the fresh condition is universally clothed with a very soft, gelatinous flesh, so as to bound canals in the substance of the animal through which a

constant circulation of the sea-water is proceeding, entering by the small pores and passing out by the large. This circulation is quite independent of any vital contraction in the sponge itself, which has never been shown to be possessed of irritability.

Spongia. E. D.

The sponge being collected by divers, and carefully washed and cleansed from its gelatinous flesh, is thus reduced to the state of a skeleton in which it occurs in the shops. It then presents itself as a light and porous mass, preserving the original *form* of the animal, with its superficial apertures and vents, of a yellowish-brown *colour*, and very *elastic*, swelling considerably when immersed in water, from its imbibition by capillary attraction, and giving it out again when squeezed. Pieces of sponge commonly contain stony and calcareous matter in their tissue; and in selecting them, it should be observed that none of these are present.

Uses.—The uses of sponge are dependent on its physical properties noticed above. It is commonly employed by the surgeon for the purpose of cleansing the surfaces of wounds and ulcers; where the latter, however, are of a contagious nature, it is proper to use lint in its place, lest the same sponge should be inadvertently employed as a means of communicating the disease to others. It is probable that hospital gangrene has often spread extensively in consequence of a neglect of this precaution. The sponging of the entire body with cold or tepid water, is commonly preferred to affusion in continued fever and scarlatina. The addition of vinegar to the water, frequently directed, is merely to increase the confidence of the patients in the remedy, and insure its faithful application. Some little management is requisite in performing this simple operation, so that the body shall not be too long exposed, and to render the sponging universal. With this view the patient should stand in a tub as for affusion, and two or three persons should be engaged in sponging him at once, large sponges being employed.—*Burnt sponge* was, till of late years, employed as a remedy for *scrofula* and *bronchocele;* but since iodine has come into the hands of practitioners, its use has been nearly exploded. Its efficacy depended on the iodides it contained. Its dose is ʒj.—iij.

APPENDIX.

Zinci Chloridum. U. S. *Chloride of Zinc*, or *Butter of Zinc.*

Phys. Props.—It occurs in the *form* of a semisolid mass, of a white *colour*, and semitransparent.

Preparation.—It is formed when *zinc* is acted on by *chlorine*, or by dissolving zinc in *hydrochloric acid*, evaporating to dryness, and fusing in a vessel with a narrow neck, or in the presence of dry hydrochloric acid gas.

Chem. Comp.—It consists of single eqs. of *zinc* and *chlorine*, and its formula is Zn. Cl.

Chem. Rel.—It fuses a little above 212°, sublimes at a red heat, and deliquesces in the air. It coagulates albumen.

Oper. and Uses—Chloride of zinc, from its power of coagulating albumen, acts as a powerful escharotic, destroying the parts to which it is applied, and forming a white slough, which separates in the course of a few days. Its operation is very similar to that of butter of antimony, and is attended with great pain. It is chiefly used externally *to eradicate malignant and other growths*, and as an application to *unhealthy ulcers*. The best mode of applying it is in the form of a paste, made up with flour, or as a lotion.

Internally it has been used in small doses in the same cases as the other preparations of zinc, but with no peculiar advantage.

Citrates of Iron.

Within the last few years several citrates of iron have been introduced as remedies; amongst which are the citrate of the

magnetic oxide, and of the peroxide, the ammonio-citrate, potassio-citrate, and sodio-citrate, the citrate of iron and quina, etc.

Citrate of Magnetic Oxide. (Prepared by dissolving the magnetic or black oxide of iron, $Fe^2 O^3 + Fe O$, in citric acid, and then evaporating to dryness in thin layers.) It is of a dark green *colour*, soluble, and the solution does not change its green colour by exposure to the air. Its *taste* is strongly chalybeate.

Citrate of Peroxide. (Prepared by adding hydrated sesquioxide of iron to a hot solution of citric acid, and evaporating in thin layers.) It is a rather insoluble salt, occurring in transparent laminæ of a garnet hue, permanent in the air.

Ammonio-Citrate of Iron. (Prepared by neutralizing the excess of acid in the last preparation by ammonia, and evaporating as before.) It is a much more soluble salt than the last, and slightly deliquescent. If the acid in the citrate be neutralized by soda or potassa in place of ammonia, we have *sodio-citrate* or *potassio-citrate* of iron produced, which very much resemble the ammonio-citrate. Quina may be also substituted for ammonia, and a double salt is formed. The *citrate of iron and quinine* is made by adding one part of citrate of quina to four parts of citrate of iron in solution, and evaporating. These salts are not capable of crystallization, but are usually evaporated on glass, from which they separate on cooling in thin lamellæ. They have not been examined carefully as to their chemical constitution, and probably are rather indefinite.

Oper. and Uses.—These preparations of iron possess no peculiar properties, but are similar to the potassio-tartrate of iron in operation; they are not decomposed by alkalies, and hence may be given with these remedies when required. The ammonio-citrate, from its solubility in water, is the most used, and can be conveniently administered in porter, which conceals its taste without its own flavour being impaired, when that beverage is not contra-indicated. The citrate of iron and quinine combines the medicinal properties both of quina and iron; it is very bitter, and best given in pills.

Dose of the Citrates.—From four to eight grains. Of the citrate of iron and quinine, from three to six grains.

Ammonio-Tartrate of Iron.

Made by digesting *iron filings* in a hot solution of *tartaric acid*, and then neutralizing with *ammonia*, and evaporating by a gentle heat. It occurs in brilliant red scales, not crystallizable, soluble in water, not decomposed by alkalies, and has a sweetish taste.

Oper. and Uses.—The same as the citrates. It is one of the least irritating of the ferruginous salts.

Dose.—Grs. iv.—viij.

Argenti Oxydum. *Oxide of Silver.*

Phys. Prop.—It occurs in the *form* of a powder of a brown *colour.*

Prep.—A solution of *silver* is made in *nitric acid*, and the nitrate thus formed is decomposed by *solution of potash.* It may be otherwise formed by boiling the fresh moist chloride with a very strong solution of potash.

Chem. Comp.—It consists of single eqs. of *silver* and *oxygen*, being a protoxide, and its *formula* $Ag+O$.

Chem. Rel.—It is reduced to the metallic state by a red heat. It acts as a base like other protoxides and forms salts with acids.

Oper. and Uses.—It may be used like the nitrate in those nervous diseases for which the latter has been recommended, such as *epilepsy*, *chorea*, etc. In those forms of *dyspepsia*, where the nervous symptoms predominate, which occurs most commonly in a similar condition of the general system, it has proved highly efficacious. It has accordingly been found a valuable remedy for the relief of those symptoms which pass under the name of *pyrosis.* Sir James Eyre has lately announced it as highly useful in the cure of *menorrhagia.*

Dose.—Gr. ½—j., or more.

Naphtha. *Pyroxylic* or *Wood-spirit* or *Hydrated Oxide of Methyle.*

Prep. and Props.—Found along with acetic acid when *wood* is submitted to destructive *distillation.* It is obtained from the distilled products by neutralizing the acids with *lime*, and re-

distilling, when the wood-spirit passes over mixed with other products. In commerce, it contains several other fluids, as acetone ($C^3 H^3 O$), etc. It is *purified* from these by mixing it in a retort with excess of chloride of calcium, which unites with the wood-spirit, and distilling, the acetone and other volatile matters pass over, and leave the wood-spirit united with the chloride of calcium. It may be separated from that salt by adding water and redistilling. Wood-spirit, when pure, is a colourless liquid, possessing a spirituous empyreumatic odour; it burns with a pale flame, mixes with water, alcohol, and ether. It has the composition ($C^2 H^4 O^2$), or it may be better represented by the formula $C^2 H^3 O, + HO$, being a hydrate of the oxide of a radical ($C^2 H^3$) called methyle, and the alcohol of that series.

Oper. and Uses.—Naphtha or wood-spirit has recently been used as a remedy for *phthisis* by Dr. Hastings; but it certainly possesses no influence either in preventing the deposition of tubercles or in causing their absorption. Sometimes it appears to check the excessive expectoration in the latter stages of this disease, as well as of chronic bronchitis, but in the earlier it frequently produces very unpleasant symptoms.

Dose.—♏ v.—xxx.

MINERAL WATERS.

All water found on the earth's surface contains more or less foreign matter. The purest is melted snow or rain water, collected at a distance from towns. The most common impurities are salts of lime, as the sulphate, and the carbonate held in solution by an excess of carbonic acid. Besides these, water always contains a certain amount of gases dissolved in it, as common air, or rather air rich in oxygen and carbonic acid. The nature of the saline impurities varies much with the kind of soil through which the water flows, for some substances, as silex, are almost insoluble, whereas limestone and gypsum dissolve to a considerable amount, and the former especially, when the water is impregnated with carbonic acid. When these foreign matters exist in the water to an extent sufficient to impart a sensible taste, it is called a mineral water. These have been divided into four

classes, depending on their chemical composition. 1. The acidulous. 2. The saline. 3. The sulphuretted. 4. The chalybeate.

1. Acidulous Waters.

These waters contain a large amount of *carbonic acid*, which gives to them their acidity, and when poured from one vessel to another they sparkle from the escape of the gas. They possess an *acid re-action*, and usually contain *carbonates of lime and magnesia* dissolved in them, and when the excess of gas is allowed to escape, these salts, being insoluble in water, are deposited. The addition of lime-water will also cause the precipitation of the carbonates from them, by uniting with the excess of carbonic acid, and hence rendering the carbonates insoluble (Dr. Clark's process of purifying hard water). The most celebrated springs of acidulous mineral waters are, *Carlsbad*, *Seltzer*, and *Ilkeston* near Nottingham.

Carlsbad, *temp.* 165° F. (*Berzelius.*)
Each wine-pint contains
Carbonic acid . 5 cub. inch.

1000 grains contain . . .	grs.
Sulphate of soda . . .	2·58
Carbonate of soda . .	1·25
Chloride of sodium . .	1·04
Carbonate of lime . .	0·31
Carbonate of magnesia .	0·18
Silica	0·07
Fluoride of calcium, Phosphate of lime, Carbonate of strontia, Carbonate of iron, Carbonate of manganese	a trace.
	5·46

Seltzer (*Bergmann*).
Sp. gr. 1·0027.
Each wine-pint contains
Carbonic acid . 17 cub. inch.

	grs.
Carbonate of soda . . .	4
Carbonate of magnesia. .	5
Carbonate of lime . . .	3
Chloride of sodium . . .	17
	29

Oper. and Uses.—The presence of carbonic acid gives to these waters their chief medicinal properties. They relieve nausea,

and are used in dyspeptic cases; the other ingredients contained in them, viz., the carbonates of soda, lime, etc., render them useful as alteratives in chronic affections of the liver, uterus, etc.; also in gout, rheumatism, and the uric acid diathesis.

2. Saline Waters.

These contain chiefly *sulphates* and *carbonates of lime, magnesia*, and *soda*, and *chlorides* of calcium, magnesium, and sodium. Potassia and lithia have sometimes been discovered in them; as also iodine and bromine. Saline mineral waters are found at *Epsom, Cheltenham, Bath, Bristol, Buxton, Seidlitz*, etc.

Cheltenham. (*Parkes and Brande.*)

In each pint.	grs.
Sulphate of soda . . .	15·
„ magnesia .	11·
„ lime . . .	4·5
Chloride of sodium . .	50·
	80·5

Leamington. (*Scudamore*).

In each pint.	grs.
Chloride of sodium . .	53·75
„ calcium . .	28·64
„ magnesium	20·16
Sulphate of soda . .	7·83
Oxide of iron, a trace	
	110·38

Bath. (*Phillips.*)
Temp. 109° to 117°, sp. gr. 1·002.
In each pint.
Carbonic acid 1·2 cub. in.

	grs.
Carbonate of lime . . .	0·8
Sulphate of soda . . .	1·4
“ lime . . .	9·3
Chloride of sodium . .	3·4
Silica	0.2
Oxide of iron, a trace	
	15·1

Buxton. (*Scudamore.*)
Temp. 82°. F. sp. gr. 1·0006.
In a wine gallon.

Carbonic acid .	1·5	cub. in.
Nitrogen . . .	4·64	“

	grs.
Chloride of magnesium .	0·58
“ sodium . .	2·40
Sulphate of lime . . .	0·60
Carbonate of lime . .	10·40
Vegetable matters . .	0·50
Loss	0·52
	15·00

Oper. and Uses.—Some of these mineral waters possess mild

purgative properties, viz., those which contain the sulphates of magnesia and soda. Epsom and Seidlitz contain sulphate of magnesia; Cheltenham and Leamington, sulphate of soda. These are useful in cases of *plethora* either local or general, or in habitual *constipation*, *piles*, and in all cases where saline purgatives are applicable. When given in small quantities they become absorbed, and thrown out of the system by the various secreting organs; hence they have been termed alterative, and are useful in many chronic diseases, as affections of the liver, dropsy, etc.

Other saline waters contain *carbonate and sulphate of lime* as their principal ingredients; this is the case with the Buxton and Bath waters; these, when taken internally, act as powerful stimulants to the system, increasing all the secretions, especially those of the skin and kidneys. They have been much used in *chronic rheumatism*, *affections of the skin and liver*, and in languid states of the general system. These waters are usually much above the ordinary temperature of the atmosphere; and this adds partly to their medicinal effect. Other saline waters are indebted chiefly to the chlorides of sodium, magnesium, and calcium for their virtues, and have been found useful in causing the absorption of indolent tumours and scrofulous glandular enlargements. Sea-water can be placed among them; it contains *bromine*.

3. Chalybeate Waters.

These all contain iron, and are characterized by a strong styptic inky taste, and by striking a black colour with tannic acid. The iron generally exists in the form of a proto-carbonate, held in solution by excess of carbonic acid; when exposed, these waters deposit the iron in the state of per-oxide, from the escape of their carbonic acid and the per-oxidation of the iron. When the iron exists as a persalt, the water strikes a blue colour with ferro-cyanide of potassium.

The most celebrated chalybeate waters are those of *Tunbridge*, *Brighton*, *Cheltenham*, *Harrowgate*, and Spa and Pyrmont on the continent.

Tunbridge. (*Scudamore.*)
Sp. gr. 1·0007.

In each gallon.	grs.
Chloride of sodium . .	2·46
" calcium . .	0·39
" magnesium	0·29
Sulphate of lime . . .	1·41
Carbonate of lime . .	0·27
Oxide of iron	2.22
Traces of manganese, vegetable fibre, silica, etc.	0·44
Loss	0·13
	7·61

Brighton. (*Marcet.*)
Sp. gr. 1·00108.
Carbonic acid gas, $2\frac{1}{2}$ cubic in.

	grs.
Sulphate of iron . . .	1·80
" lime . . .	4·09
Chloride of sodium . .	1·53
" magnesium .	0·75
Silica	0·14
. . . .	0·19
	8·50

Harrowgate, Oddie's Chalybeate. (*Scudamore.*)
Sp. gr. 1·0053.

In each gallon.	grs.
Chloride of sodium	300·4
" calcium	22·
" magnesium	9·9
Sulphate of lime	1·86
Carbonate of lime	6·7
" magnesia	0·8
Oxide of iron	2·40
Residue, chiefly silica	0.40

Oper. and Uses.—The chalybeate waters act upon the system in the same way as other compounds of iron; they are used with great advantage in anæmic states of the system, but are contra-indicated in plethoric habits.

4. Sulphuretted Waters.

All these waters contain hydro-sulphuric acid (sulphuretted hydrogen), and are known by their odour, and the black preci-

pitates they cause when salts of silver or lead are added to them. The gas is expelled by heat.

The most celebrated of these waters in Britain are *Harrowgate*, *Cheltenham*, and *Moffat*, and Aix-la-Chapelle on the continent, which is also a thermal spring.

AIX-LA-CHAPELLE. (*Bergmann.*)

Temp. 143° F.

In each wine pint.

Sulphuretted hydrogen 5·5 cub. inches.

	grs.
Carbonate of soda . .	12·
" lime . .	4·75
Chloride of sodium . .	5·
	21·75

MOFFAT. (*Garnet.*)

Nitrogen . . .	0·5	cub. in.
Carbonic acid .	0·6	"
Sulphuretted hydrogen . . .	1·2	"

Chloride of sodium 4·5 grs.

HARROWGATE. (OLD WELL.)

Sp. gr. 1·01324 at 60°.

	cub. in.
Sulphuretted hydrogen	14·0
Carbonic acid	4·25
Nitrogen	8
Carburetted hydrogen .	4·15
	30·4
also	grs.
Chloride of sodium .	752·0
" calcium .	65·75
" magnesium	29·2
Bicarbonate of soda .	12·8
	859·75

CHELTENHAM. (SULPHUR SPRING.)

(*Brande and Parkes.*)

Specific gravity 1·0085.

In each wine pint.	cub. in.
Carbonic acid	1·5
Sulphuretted hydrogen .	2·3
	grs.
Sulphate of soda . . .	23·5
" magnesia .	5·
" lime . . .	1·2
Chloride of sodium . .	35·
Oxide of iron	0·3
	65·

OPER. AND USES.—These waters have chiefly been used in *cutaneous affections*, as psoriasis, lepra, etc.; also in *gout*, and *rheumatism*, and in atonic conditions of the uterus. They act as stimulants, and increase the secretion of the skin.

BATHS.

By the term *bath* we understand the immersion of a part or the entire of the body in a medium differing, in certain particulars, from that to which it is accustomed. *Water*, *vapour*, and *air*, are severally used with this view, and accordingly constitute varieties of baths, in which temperature and their mode of application make further subdivisions.

Water Baths.

Cold Bath.

The temperature which would constitute the cold bath, ranges between 33° and 60° Fahr.*

Operation.—When a person plunges into water of this temperature he experiences a sudden sensation of cold upon the surface, which is accompanied by an oppression of breathing, giving rise to the performance of the act in a series of convulsive gasps. This is called the *shock*. After a little while the gasping goes off, the sensation of cold becomes agreeable, and, if at this period the person leaves the water, is followed by a universal warmth upon the surface, denominated the *glow*, with a pleasant feeling of refreshment in the system generally. The primary effect of the impingement of the cold water upon the surface, is a contraction of the superficial vessels, with a repulsion of the circulating fluid upon the internal organs. The impression upon the cutaneous nerves gives rise to a reflex action of the respiratory muscles, from which the anhelation originates. The restoration of the circulation on the surface, if followed up by active exercise, may terminate in perspiration. Ill effects arise, however, from too prolonged immersion. The harmless sensation of cold, which the bath at first occasions, passes on to an unpleasant degree of chilliness, accompanied by shivering; the bulk of the body generally is lessened, as indicated by the falling off of rings from the fingers; the accumulation of blood in internal organs becomes

* The temperatures here given are those adopted by Dr. Forbes in his article on Bathing, in the Cyclopædia of Practical Medicine.

more or less confirmed, and on leaving the water, no reaction or a very feeble one ensues; the surface remains cold, the extremities benumbed, while headache, oppression of breathing, pain in the side or chest, and a universal feeling of chilliness and lassitude take the place of that alacrity which ought to have ensued. Under proper management, these symptoms may gradually disappear, leaving no further unpleasant result; but, on the other hand, they may be the foundation of acute visceral diseases, catarrh, or inflammation of the lungs, congestion of the liver, etc.

Uses.—The objects had in view in prescribing the use of the cold bath, are either the production of a powerful effect upon the nervous system, or the tonic influence which it is found to exert, when followed by an energetic reaction. The practitioner avails himself of the beneficial influence of the shock in certain nervous diseases, manifested by a greater or less modification of sensory or motor functions, and unaccompanied by a congestive or inflammatory condition of internal organs. But the more frequent object of cold immersion, is the production of its tonic effect, which appears not less closely connected with the shock than with the reaction, for as much as the latter is in a great degree dependent upon the former. When the system, from debility, is unable to establish the glow, the cold bath ought not to be employed, and, according as the patient's strength improves, his stay in it may be prolonged; since, under these circumstances, the length of the immersion and the lowness of the temperature will render the reaction greater, and the tonic effect more marked. It is accordingly less fitted for the debility which succeeds to acute disease, than for that which is more habitual to an individual, and attributable to unfavourable hygienic conditions, such as confinement to business, residence in a crowded city, imperfect nourishment, and other weakening circumstances connected with daily life, or consequent upon continued debauchery. Besides the *contra-indication* of extreme debility where reaction cannot be established, it should be avoided by persons of an apoplectic habit, as tending by repulsion to occasion a congested state of the cerebral vessels. In like manner, it should be avoided by persons labouring under any serious organic disease of the heart, lungs, and kidneys, or indeed of any important internal organ. It is best, before using the cold bath, to raise the circu-

lation by active exercise to such a state of excitement, that reaction will be sure to follow the immersion, and on no account to allow the surface to become chilled before plunging into the water. Swimming is, on the same grounds, a valuable adjunct to its use.

Cool Bath.

This term is applied to the bath when it ranges between 60° and 75° Fahr.

Oper. and Uses.—Similar to the last, but less powerful. It is accordingly much more used for mere purposes of health, and is more fitted for debilitated individuals.

Temperate Bath.

This term embraces a range of temperature from 75° to 85° Fahr.

Oper. and Uses.—Approaching more closely the temperature of the body, both the shock and reaction are almost insignificant; but still it is beneficial, where there is too little strength in the body to tolerate a lower temperature.

Tepid Bath.

This is regarded as extending between the temperature 85° and 92° Fahr.

Oper. and Uses.—It is intermediate in operation between the last two mentioned and the warm bath, and varies both in its effects and uses according as the temperature is lower or more elevated. By its higher but still not relaxing temperature, it permits of longer immersion than in those before considered, and accordingly allows of more perfect ablution where it is employed for the purposes of cleanliness.

Warm Bath.

The temperature of the warm bath extends from 92° to 98° Fahr.

Operation.—The first effect of this bath is to produce a sensation of warmth upon the surface of the body, the pulse becomes quicker, fuller, and softer than before, while an agreeable feeling

of placidity and enjoyment takes possession of the mind. The cutaneous circulation especially becomes excited, and the body acquires an increase of bulk manifested by the tightening of rings upon the fingers. On leaving the bath a disposition to lassitude and mental inertia continues for a longer or shorter period, accompanied by gentle perspiration, especially if the latter be favoured by the exhibition of warm drinks. Its modus operandi appears to be twofold. No doubt the warmth of the bath excites the action of the heart, and proves thus a general stimulant, but in addition to this and its local effect in determining to the skin, it has another not less important operation in diminishing muscular tonicity. It is this which accounts for the softening of the pulse, the indisposition to muscular exertion, and the equalization of the circulation which follow upon its use. When immersion is long continued, accordingly, this sedative effect predominates, considerable muscular relaxation is occasioned, and syncope may even ensue.

Uses.—According to the temperature at which it is employed, the duration of the patient in it, and the subsequent treatment, the warm bath may prove stimulant and tonic on the one hand, or sedative and diaphoretic on the other. The latter object is best obtained by its prolonged employment, and subsequently placing the patient between blankets, and supplying him copiously with warm diluent drinks. It is this method, not carried on to syncope, which proves of service in incipient catarrh and in some congested states of thoracic and abdominal organs, as well as chronic rheumatism, etc. Inflammatory states of the mucous membranes, especially in children, are remarkably relieved by it. Should it be desired to produce syncope, or at any rate a more powerful relaxant operation upon the muscular system, the temperature should be more elevated and the duration more prolonged. This method of employing it is had recourse to when we seek, by relaxing spasmodic action in the ducts (?), to assist the transit of calculi through the biliary or urinary passages, or in the reduction of dislocations or herniæ opposed by a powerful action in the surrounding muscles. It is extremely useful to remove fatigue following upon long journeying. When used as a tonic, it should be followed by active exercise. While applicable to these purposes, it is contra-indicated in all cases of

acute disease where active fever is present, its stimulant operation under such circumstances seriously augmenting the existing disease. It is obviously unfitted for employment in an equal degree by the presence of congestion or a tendency to determination of blood to the head.

Hot Bath.

The temperature of the hot bath commences at 98°, and extends up to 112° Fahr.

Operation.—From being to a greater or less amount above the temperature of the body, the hot bath constitutes a much more powerful stimulant than the preceding, affecting the pulse in the same way, but to a greater degree, and inducing sensations of fulness in the head, and excitement of the cerebral circulation, manifested by throbbing headache, strong pulsation of the carotids, giddiness, etc.

Uses.—The therapeutical employment of baths above the temperature of the body is much more circumscribed than of those below it. The cases enumerated by Dr. Forbes for its employment are—1°. *Extreme exhaustion*, such as occurs in spasmodic cholera, pernicious fevers, ague, etc. 2°. Sudden *retrocession of cutaneous diseases*, whether acute or chronic, and some forms of enteritis and gastritis, which follow upon retrocedent gout. 3°. To excite the skin in some obstinate and indolent forms of *cutaneous diseases.* 4°. In *chronic paralysis*, where its stimulant effect will not hazard the re-establishment of disease within the head. The contra-indications noticed when speaking of the warm bath, hold with augmented force here.

Shower Bath.

The short duration of the cold shower bath, by lessening its refrigerant operation, renders the primary shock the most important object which it is fitted to fulfil; and this may be augmented by diminishing the temperature, and increasing the fall. It is, accordingly, adapted in a special degree for those cases where a powerful impression is desired to be made upon the ner-

vous system, as in *chorea*, some forms of *epilepsy*, and *hysteria*. From the first flow of the water being upon the head, its use proves very beneficial to such as are subject to *determination of blood* to that part. In such individuals, the feet are apt to be cold, while the face and head are flushed and hot; and, when this is the case, it is a good plan to make the patient stand in hot water at the time of receiving the bath. Some individuals cannot bear the shock of cold water induced in this way, and for them it may be advisable to employ water at a little more elevated temperature, gradually lowering it as their strength improves.

Affusion.

When affusion is about to be employed, the patient is seated in a large tub, and the water poured from a pitcher over his head and shoulders, so as to run down over his entire body. The water is either used cold or tepid. Cold affusion is one of the most powerful general refrigerants we employ, lessening the temperature of the surface of the body, and operating decidedly as a sedative upon the heart. Its use was recommended by Dr. Currie in inflammatory fever (*synocha*), where the heat of the skin was distinctly and steadily above what was natural both to the feelings of the patient and to the hand of the physician. This is a condition which rarely occurs in the present epidemic constitution, and accordingly, in continued fever, it has for the present fallen into disuse; but in the purely inflammatory form, its administration used to be succeeded by general diminution of the excessive action in the system, and often by a critical sweat. In *scarlatina*, however, it is still advantageously employed, in order to reduce the elevated temperature of the surface.

The affusion of *tepid* water sometimes takes the place of the cold affusion, and, although a less powerful refrigerant, is highly useful, when the latter is considered unadvisable from the dread of its occasioning internal inflammations.

Cold affusion is a ready and effectual means of reducing the temperature of the scalp in *inflammations of the brain*. In such cases, it is practised upon the head alone, held over a large basin; and it is equally serviceable when the excitement of the circulation has not proceeded beyond simple *determination of*

blood. It is often useful to place the patient up to the shoulders in a warm bath at the time of employing the remedy.

Local Baths.

Although poultices, fomentations, and lotions, however medicated, are to be considered in the light of local baths, the term is for the most part employed to signify the immersion of some part of the body in water of various temperatures. The hip and foot-baths are those most frequently employed either for their derivative or revulsive effect. The derivative operation of the latter, when used hot, renders it a valuable remedy in the early stage of *catarrh*, and local visceral *congestions*, whether in the head, chest, or abdomen, as well as in determinations of blood to the former. It may be rendered more stimulating by the addition of flour of mustard. The warm hip bath, used previous to the catamenial period, is often an effectual means of assisting the flow in certain forms of *amenorrhœa* and *painful menstruation;* in the latter case, it may sometimes be alternated with the cold hip-bath. It is also used with advantage in some *irritations of the pelvic and urinary organs.* Very beneficial results sometimes follow the use of the cold hip-bath in *excessive menstruation* and some forms of *leucorrhœa;* but much caution is to be practised in its employment.

Vapour Bath.

The vapour bath consists in enveloping the patient in the vapour from hot water, either enclosing the head, or excluding it so that he may breathe the external atmosphere. A much higher temperature may thus be borne than where the body is immersed in water, inasmuch as the conducting power of steam is less than that of the denser fluid. Its action is more localized upon the skin, and hence, while it is less generally stimulant, it is more diaphoretic than the warm bath. Accordingly, it is of great service in cases where we desire to cause an active derivation to the surface, as in congestive and subinflammatory states of the thoracic and abdominal organs, incipient catarrh, etc. In the treatment of cutaneous diseases, it proves equally and sometimes

more efficacious than the warm bath. A great value attaches to the remedy, moreover, on the ground of the facility with which it may be applied. All that is necessary is to seat the patient upon a stool with a pail of hot water beside him, and then to envelope both in a thick blanket pinned closely round his neck. The steam from the water soon surrounds his body; and should it cease to be evolved before the bath has been sufficiently prolonged, its evolution may be restored by dropping a heated brick into the water. It may be used of a higher temperature when not breathed, than when the vapour is respired. It is rarely advisable, in the former instance, to employ it above 120°, or, in the latter, above 110° Fahr.

Warm Air Bath.

This has more stimulating properties than the vapour bath, especially upon the skin. When breathed at the same time that the body is enveloped in it, a much less elevated temperature can be tolerated, and its use is followed by general uneasiness, heat of skin, and frequency of pulse, with a sense of fulness in the head and beating of the temporal arteries, a state which is relieved after a short time by a copious perspiration. Even when the head is not included, a high temperature will act rather as a general stimulant than as a sudorific; the latter operation being best obtained at the heat of from 85°—100° F. An advantage attaching to it is the facility with which it may be administered to persons in bed. A wicker framework may be laid over the patient so as to elevate the bedclothes, and the heated air from a lamp may be admitted, by means of a metallic tube, into the empty space. It is by some preferred either to the vapour or warm bath for producing a derivative effect upon the skin in *albuminuria*, and is often efficaciously employed in *collapse*, and in some obstinate forms of *chronic rheumatism*.

Douche Baths.

The douche bath consists in the application of a forcible stream of warm or cold water to a part of the body, in such a manner, that the impulsion which accompanies it shall aid in producing

a stimulant effect. It is sometimes employed in *palsy* and *chronic rheumatism* with a beneficial result, when directed upon the joints and limbs affected. At Aix-les-Bains, in Savoy, as in some other places, streams of water naturally warm are obtained with a sufficient fall to constitute natural douche baths.—A *vapour-douche* is still more highly stimulant; and when at the temperature of 212° as from boiling water, is, when sufficiently continued, escharotic; it is fitted for producing counter-irritation in the same cases as the moxa.

Medicated Baths.

We do not intend much more than to refer to the application of medicinal agents to the surface of the body in the form of baths. Saline, acid, and alkaline matters, with iodine and sulphur, are some of the more important ingredients with which the warm bath is medicated. *Sea-bathing*, either warm or cold, is the most frequently used of the former class. But not only does its saline matter render it more stimulating, and its use is followed by a more perfect glow, so that cold sea-bathing may be often tolerated by those who have little power to establish reaction after the ordinary cold immersion, but the materials it holds dissolved would appear to exert a beneficial action upon the frame in certain diseases of debility, especially in those which we are accustomed to group together as *scrofulous*. The *nitro-muriatic acid bath* has been recommended in certain chronic diseases of the liver. *Alkaline baths*, containing soda, potash, or soap, are advantageously employed in some forms of cutaneous disease, but the solution ought not to be very strong. *Iodine baths* are employed in scrofulous diseases: a certain portion of the remedy becomes absorbed, and acts upon the system in the manner indicated when iodine was under consideration. They are prepared by dissolving iodine in water by the aid of some iodide of potassium, and adding the solution to the ordinary warm bath. *Sulphur baths* are employed for the cure of itch and other skin diseases. They are prepared with the sulphuret of potassium, or the sulphureous mineral waters may be used for the purpose.

CORYLACEÆ.

Tannic Acid.

Mode of Preparation.—Tannic acid, or, as it was formerly called, tannin, can be conveniently made by introducing powdered galls into a conical tube, closed at one end by means of a piece of linen, and pouring over them ether free from alcohol, but saturated with water, and allowing it to percolate. The aqueous ether takes up the tannic acid, with a small quantity of colouring matter, gallic and ellagic acids, etc. By standing, the fluid separates into two layers, the lower one being a solution of tannic acid in water, which, by evaporation and washing with ether, yields tannic acid in the form of a yellowish non-crystalline powder. 100 parts of gall-nuts are said to yield about 40 parts of tannic acid.

For chem. comp. and relations of tannic acid, see *Nut Galls.*

Gallic Acid.

We do not at present understand exactly the changes which take place when tannic acid is converted into gallic. When a solution of *tannic acid* is *exposed to the air*, oxygen is absorbed, carbonic acid is given off, and gallic acid is found in the solution along with ellagic acid. The following formula represents the decomposition:—1. eq. tannic acid + 8 eqs. oxygen = 2 eqs. gallic acid + 4 carbonic acid + 2 eqs. water.

Again: gallic acid may be procured by adding *sulphuric to a solution of tannic acid*, which causes a precipitate of the tannic acid in combination with sulphuric: this precipitate is dissolved in dilute sulphuric acid by the aid of heat, and the solution boiled for a few minutes; the tannic acid is all decomposed, and on cooling, crystals of gallic acid (coloured) are obtained. The colouring matter formed in the process appears to be a secondary product.

Gallic acid can also be formed by boiling tannic acid with an excess of a caustic alkali.

There is some reason to suppose that tannic acid contains

gallic acid united with some other body. 2 eqs. of gallic acid $+ C^4 H^4 O^4$ (starch sugar) = 1 eq. tannic acid.

Oper. and Uses.—Gallic acid is one of the most powerful astringents that chemical art has derived from the vegetable kingdom. How it produces its effects we are unable to state, but that in most forms of passive hæmorrhages and fluxes it is an invaluable remedy, a tolerably extensive experience of its use by both the authors of the present work has fully convinced them. The chief of the cases in which they have employed it, and where they have found it of the greatest service, are *menorrhagia* and *leucorrhœa,* as well as for checking the distressing *night-sweats of phthisical* patients. In the two first of these, especially, no astringent that they have employed will bear a comparison with this, either for the rapidity with which the cure is effected, or the permanency of the result. Like other medicines, it sometimes fails in arresting the sweats of phthisis, although, on the whole, they have had reason to be more satisfied with it than with any which they had formerly been in the habit of prescribing. If its use be continued beyond two or three days, it manifests some disposition to confine the bowels. The *exessive expectorations* of chronic bronchitis or phthisis are also much influenced by its administration.

They have not yet subjected *tannic acid* to a sufficient series of experiments as will enable them to express any opinion on its relative value in the treatment of these affections, although, in all probability, its utility will be found scarcely less extensive.

Dose.—Grs. ij.—v. every three or four hours, either administered in the form of powder, or made into pills with some extract of gentian. We have found it also highly useful in *leucorrhœa,* when employed as an injection. It is said to be the active ingredient of Ruspini's styptic.

THEINE, CAFFEINE, AND THEOBROMINE.

Within the last few years, much interest has been attached to certain principles which are found in tea, coffee, chocolate, and other substances which have been used by different nations in the place of them; for it has been discovered that the same princi-

ple, which is very peculiar in its constitution, has been found in plants belonging to very different natural orders.

Theine, Caffeine or Guaranine.

A crystallizable principle found in tea and coffee, in the leaves of the Ilex Paraguayensis, and in Paulina sorbilis, or Guarana officinalis. It is *obtained* from infusion of tea or coffee by precipitating all the other matters, as the tannic acid, colouring matter, etc., by means of *diacetate of lead*, removing excess of lead with *sulphuretted hydrogen*, and then evaporating. The theine crystallizes in beautiful prisms of a silky lustre, very much resembling asbestos, or spun glass. It is soluble in water, alcohol, and ether; the solutions are neutral in their reaction, have a strong bitter taste, and are precipitated by tannic acid. Theine heated above 212° F. loses about 8 per cent. of water. It fuses at 352° F., and sublimes in needles similar to benzoic acid in appearance. Heated with nitric acid, and then treated with ammonia, it gives a purple colour not unlike murexide from uric acid.

The composition of theine is $C^8H^5N^2O^2$. It contains a larger per-centage of water than any organic body, urea and theobromine excepted.

Theine may be obtained also by sublimation; and its presence in tea, coffee, etc., can be easily shown by putting some of these substances (quite dry) in a watch-glass, and inverting over it a smaller one; when heat is gradually applied to the lower glass till the temperature reaches a little above 352° F., crystals of theine will appear upon the upper one. The leaves of the Ilex Paraguayensis are used in South America in the place of tea. *Theine* is not found in the common holly. The Guarana is made from the seeds of the Paulina sorbilis, and is used in Mexico for the same purpose.

Theobromine.

Found in the Theobroma Cacao. It is a neutral crystalline body not unlike theine, and can be obtained from cocoa by a

similar process. It is much more difficult to crystallize, but can be sublimed in small opaque feathery crystals. It is very little soluble in cold water, alcohol, or ether, but more soluble in the same when heated. It is also soluble in acids. The formula for theobromine is $C^9H^5N^3O^3$. With nitric acid and ammonia it yields a purple colour, in the same way that theine does. These colours differ from that produced from uric acid, by not disappearing on the addition of an alkali.

Oper. and Uses.—The common effects of the infusion of tea and coffee are well known, viz., their antisoporific qualities, which are due to volatile oil; but the question arises, Have they any other effects than those which are usually ascribed to them?

There are several reasons for supposing that they have, viz.:—

1st. From the identity of caffeine, theine, and guaranine, and the similarity of theobromine.

2d. From their being found in plants very dissimilar in a botanical point of view.

3d. From these plants, so containing these principles, being instinctively used by almost all nations, but chiefly by those who use largely an amylaceous diet.

4th. From their peculiar highly azotized composition.

5th. From their producing little or no physiological effects, although possessing so large an amount of nitrogen in their composition, and thus differing from strychnia, etc.

6th. From their resembling taurine (a principle from the bile) very closely in their composition.

So that probably they may act by yielding a substance which, combining with the amylaceous principles of the food, may produce bile. That such a combination can take place, we have proof in the conversion of benzoic into hippuric acid in the animal economy, by its union with a nitrogenized compound.

For details on this subject of theine, etc., see a paper by Dr. Garrod, in Pharmaceutical Journal (April, 1843).

Isinglass Plaster.

Prep.—A solution of isinglass while warm is carefully spread over oiled silk, stretched and nailed evenly down upon a board, by means of a flat brush. As the coat dries another is to be laid

on, as far as to four or five, each one being applied in a direction across the preceding. Mr. Jacob Bell says, that "the oiled silk has been, in a great measure, superseded by the use of a membrane consisting of the peritoneal covering of the cœcum of the ox, rubbed down and carefully polished in the manner in which the gold-beater's skin is prepared."

Uses.—The chief importance of this plaster, introduced into surgical practice by Mr. Liston, depends on its unirritating nature on the one hand, and its transparency on the other. It is thus peculiarly adapted for use in the management of wounds, whether accidental or resulting from surgical operations. The plaster need not be removed to examine the progress of the cure, thus avoiding a painful and disturbing proceeding, while altogether it is peculiarly neat and cleanly. It has been long in use in University College Hospital.

ELECTRICITY.

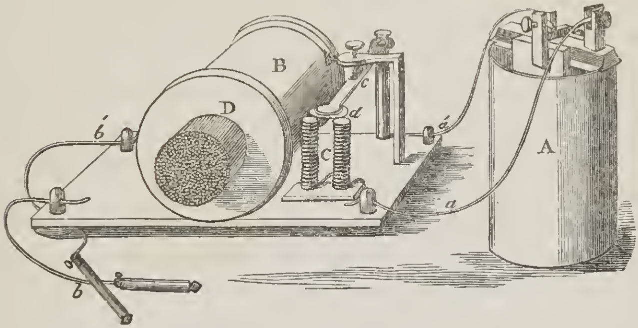
There are several modes of using electricity as a therapeutic agent. We may employ, 1st, the common electric machine, 2d, the galvanic or voltaic circle, or 3d, the magneto-electric and electro-magnetic apparatus.

When the *common electric machine* is employed we can apply the electric fluid in several ways: thus, we can administer it in the form of *shocks*, when the body or part affected is made a part of the electric circuit, connecting the outside with the inside of the Leyden jar; or we can present the part affected to the prime conductor, and pass *sparks* to it from a brass ball; or if it is wished to administer it in a more gentle manner, we may substitute a metallic or wooden point for the ball. Again, the patient may be placed on an insulated stool, and be made part of the prime conductor, and have sparks drawn from any part of his body, either by means of the knuckle, a brass ball, or a pointed body of brass or wood.

When we wish to apply the electric fluid from a voltaic circle, we should use a common trough or pile, consisting of about 50 pairs of plates, and attach to the connecting wires sponges moist-

ened with salt and water; these are placed on the parts between which we wish the current to pass. This mode of applying electricity is troublesome, and now but seldom used.

A much more convenient method of applying this form of electricity is by means of the *electro-magnetic* apparatus, one of the best forms of which is shown in the annexed cut.



Electro-magnetic apparatus.

(A) represents the jar containing the voltaic battery, which is one of Smee's form, consisting of a plate of platinized silver, and two plates of amalgamated zinc united with each other.

(*a*) (*a'*) are wires proceeding from the two poles of the battery.

(B) is a wooden reel, upon which are wound two coils; the primary coil consists of about 36 feet of pretty stout copper wire, insulated with silk or cotton, one extremity of which is connected with the zinc, the other with the platina plate of the battery through the connecting wires (*a*) (*a'*). The second coil, much longer than the first, consists of about 1000 feet of fine wire, also insulated, and its extremities terminate at (*b*) (*b'*).

(C) a soft iron horse-shoe, around which part of the primary coil is wound in its passage from the battery by *a* to the reel, and which, therefore, becomes a temporary magnet when the electric current is passing through the primary coil.

(*c*) an apparatus for interrupting or renewing the current through the primary coil; it consists of a small platina plate fixed on a thin vibrating brass arm, and a platina pointed wire, the

circuit of the primary coil being complete when they are in contact, but broken when they are not.

(D) is a bundle of soft iron wire.

(*d*) is a plate of iron fixed at the extremity of a thin brass arm, which allows it to vibrate, and by this means to break and renew the connexion between the platina plate and point at *c*.

The apparatus is thus seen to consist of two distinct circuits unconnected with one another; but so arranged that a current being established in the one, another current in the opposite direction is set up in the other. Now the first circuit is that to which the battery A is attached, and when closed by the contact of the platina plate on the brass tongue with the platina point at *c*, a current passes by *a* through the wire encircling the horse-shoe, (temporary magnet,) C, and along the primary coil within the cylinder B through the brass lip and platina plate and point *c*, and so by the wire *a′* to the other pole. Now it must be borne in mind that C is rendered magnetic by this current, and so a provision is made for breaking the circuit, almost as soon as it is established, by drawing down the iron plate *d*, and so the whole lip from the platinum point at *c*, which is the only spot where the circuit can be broken; the elasticity of the lip suffices to bring it again in contact with the platina point, and so to restore the current, and a constant vibration of the tongue is thus established so long as the battery A is attached. This being comprehended, it will be evident that each time the current through the primary coil in the cylinder B is thus established and broken, a similar current is established and broken (by induction) in the secondary coil connected with the wires *b b′*, provided that their circuit is rendered complete by joining the wires or interposing a conducting medium. When the two hands of any individual grasp the two hand-pieces attached to them, these conditions are fulfilled, and, as with ordinary machines, a shock is perceived whenever the current is made or broken. It will be observed that nothing has yet been said about the bundle of soft wire D, and, indeed, the apparatus is complete without it, so far as the obtaining of a shock is concerned; but the intensity of the latter is very much increased by this addition, inasmuch as being rendered a powerful magnet by the influence of the primary coil, the bundle reacts

in an equal degree upon the secondary, augmenting the intensity of its current.

It is well to use pieces of barometer-tube (glass being a non-conductor) near the termination of the wires *b b′*, and enclosing them for the convenience of handling by the operator, while the wires themselves are made to terminate in small pieces of sponge, which, when applied to the dry skin, should be moistened with salt and water.

In place of the apparatus just described, the *magneto-electric* apparatus is sometimes employed, in which the secondary current is obtained from the constant formation and destruction of a temporary magnet by induction from a permanent one, the coil of wire surrounding the former being connected with the hand-pieces.

Operation.—Electricity (either common, voltaic, or derived from the magnet) acts as a stimulant to the parts through which it passes; and, when transmitted along the nerves, causes sensations peculiar to each; thus we can produce sounds, a peculiar odour, taste, and a prickling feeling, according as we excite the auditory, olfactory, gustatory, or nerves of common sensation. When transmitted along motor nerves, it causes violent spasmodic contractions of the muscles; and the secretions of organs seem to be influenced by passing the current along the nerves supplying them. For a certain time after death in men and animals, electricity, when transmitted along the spine or the course of any nerve, causes more or less powerful muscular movements. The involuntary muscles are less easily excited by electricity than the voluntary. When very powerful, the electric current may produce disagreeable symptoms, and even death, as is seen in the effects of lightning.

Uses.—As electricity acts as a powerful excitant, it can be usefully employed in diseases attended with diminished nervous action, whether characterized by deficient sensation, motion, or secretion. It has also been beneficially used in suspended animation. The diseases in which it has proved most successful are the various forms of *paralysis*, either general or local, especially the latter. In *general paralysis*, we should be careful that there exists no inflammatory action or softening of the nervous centres; for, if such be the case, ill effects may arise. In short,

the contra-indications are the same as those of strychnia. In *paraplegia*, especially that form depending on the poisonous influence of lead, it is frequently very efficacious. The forms of *local paralysis* which have been benefited by this therapeutic agent, are atonic *deafness*, *amaurosis*, *aphonia*, *wrist-drop*, etc., and indeed all kinds depending on simple atony of the nerves supplying the parts, either from disease or the influence of the poison of lead; also various forms of *neuralgia* or *sciatica*, etc., some species of asthma and hysterical paralysis, tonic contraction of muscles and nervous pains. In deficient secretion of the uterus, as in *amenorrhœa*, depending on an atonic condition of habit, the passing of the current through that organ is often of great service; but care should be taken that pregnancy is not the cause of the suppression. Electricity may sometimes be successfully employed in causing the dispersion of various *chronic tumours*.

In *poisoning by narcotics*, as opium, the continuous passage of powerful electric shocks through the patient for many hours, is an exceeding useful auxiliary to the usual means of keeping the patient awake, until the narcotic effects of the poison have passed off.

Lastly, in *asphyxia*, as from drowning, carbonic acid gas, etc., electricity is of the greatest use in restoring animation, by exciting the action of the heart and diaphragm.

GENERAL BLOOD-LETTING.

Of all the remedial means which the practitioner possesses for combating disease, blood-letting is at once one of the most useful, if judiciously employed, and the most injurious when practised unadvisedly or carried to too great an extent. Blood-letting is divided into two principal forms, namely, *general* and *local:* the latter is performed by means of scarifications, cupping, or leeching; each of which modes commends itself to our use, in certain individual cases of disease. Where an inflamed organ can be arrived at with facility, and no evil can arise from it, scarifications may be performed, as in tonsillitis, in phlegmonous erysipelas, or in chemosis occurring in the conjunctival membrane of

the eye; and although in many cases of internal diseases, cupping or leeching may be equally advisable, yet the former, from the very nature of the operation, is less capable of being generally applied. But we do not intend dwelling upon these cases here, and would only remark that, in severe inflammatory disease, accompanied by active fever, a full state of the blood-vessels, and an excited circulation, together with an over-fibrinous condition of the blood itself, little permanent good can be expected from a remedy which merely modifies the local fulness of the affected organ, without altering the morbid state of the system at large. It is only where these have been subdued by general depletion, or been absent from the first, that topical blood-letting can exert its beneficial influence, unless, indeed, the extent to which it is practised be tantamount to a general blood-letting.

We may consider the effects of general blood-letting under the following heads. 1°. Its effects upon the quantity of the blood. 2°. On the quality of the blood. 3°. On the circulation. 4°. On the functions of the nervous system.

1. The first effect of blood-letting, and the most obvious, is *to reduce the bulk of the circulating fluid;* but since absorption of thinner fluids is constantly and rapidly proceeding from all parts of the living body, this is not a permanent result. When the quantity withdrawn is very excessive, no doubt this part of its operation is more considerable; but, in most cases, the bulk of the blood is not long in being restored, by the means adverted to.

2. A no less important change produced by blood-letting, is manifested upon the *composition of the fluid* itself. When it is in a healthy state, blood-letting affects the relative proportion of all its ingredients. The red particles of the blood undergo a most marked diminution, as also do the fibrin and albumen, although in a less degree. The quantity of water, on the other hand, becomes augmented, and this, with the former alteration, influences the rapidity of coagulation and the appearance of the clot. A second blood-letting, accordingly, practised soon after the first, would present a more rapid coagulation, in consequence of the slight dilution to which the blood had been subjected, since it always congeals more quickly under this condition; the clot would be less firm, and, perhaps, smaller than before, while the amount of serum in which it floats, would be relatively larger.

But still greater changes are observed in disease. When an organ is suffering under active inflammation, the blood often presents appearances more or less peculiar to this condition. One of these is the buffy coat, which is now satisfactorily shown to depend upon the sinking of the red particles from the liquor sanguinis, in consequence of the greater rapidity and permanence of the aggregation they manifest on removal from the vessels, and the coagulation of the fibrin on the surface of the blood, without entangling any of them in its substance. Blood-letting powerfully influences this condition, so much so, indeed, that in a full blood-letting, we find the cups last drawn with scarcely an indication of buff upon the clot, while the first were strongly buffed and cupped. This appearance, however, is apt to return, sometimes within a very few hours of its departure.

3. General blood-letting operates in a special manner *upon the organs and function of circulation*, affecting not only the action of the heart, but the tonicity of the arterial coats and muscular system at large. Hence it is that it constitutes one of the most important *sedatives* we possess. Under its judicious employment in inflammatory fever, the heart's action becomes less violent, the pulse loses strength, and at the same time acquires softness, from the relaxation of the excessive tonicity of the contractile coat of the artery.

4. The influence of blood-letting upon the *functional energy of the nervous system* is in some degree included in the term "sedative," but becomes more manifest the greater the quantity of blood drawn and the more rapid its abstraction. In this case syncope ensues, constituted by temporary loss of consciousness and volition, with pallidity of the features, an imperceptible pulse, and a feeble condition of the heart's sounds, which are "very short, and generally without a second sound." Vomiting often accompanies the restoration to consciousness. Syncope is more readily induced when the patient is placed in the erect than in the recumbent posture, in consequence of the latter favouring by gravitation the supply of blood to the central organs of the nervous system, while the former opposes it. The mode of drawing the blood also influences its occurrence. When withdrawn slowly from a small orifice in a vein, a large quantity may be taken, but where it is desired to induce fainting at the smallest expense

of the circulating fluid, it should be removed suddenly from a large orifice, or from both arms at once, and the patient should be made to stand during the operation. Where bleeding to syncope has been practised in the recumbent position (at all times a dangerous proceeding), the faintness is very slow in being recovered from, and sometimes even sudden dissolution may occur. The tolerance of blood-letting, as it is termed, is remarkably augmented by the presence of some diseases, while it is diminished by others. This subject has been investigated by Dr. Marshall Hall, and the results to which he has arrived are the following, namely, that in congestion of the brain, and inflammatory diseases generally, the tolerance of blood-letting was increased, but in the latter most remarkably, when they have attacked the serous, synovial, and fibrous membranes, or the parenchyma of organs, and least, when occurring in the mucous or cutaneous tissues. In the idiopathic fevers, on the other hand, in dyspepsia and chlorosis, as well as in "affections of nervous irritability, such as are observed from intestinal derangement, exhaustion, etc., and in delirium tremens," the tolerance is lower than in health.

Uses.—The discrimination of cases calling for the employment of this remedy is often no easy matter in actual practice. Where *plethora* or an active *inflammatory fever* occur alone, or co-exist with acute inflammation of some important organ, it becomes an evident indication, on the one hand, to diminish the fulness of the sanguiferous system, alter the morbid condition of the blood, and lessen the irritability of the heart by general blood-letting, while, on the other hand, by doing so, the practitioner hopes to aid the resolution of any local hyperæmia which may be combined. But the fact of plethora existing is not in every instance quite so evident. The pulse, our ordinary guide, may rather be small than full, and weak rather than strong, so that if we relied upon these characters we might be led into considerable error. An examination of the heart's action will less readily deceive: where its contractions are forcible, its impulse abnormally strong, and its first sound prolonged and dull, we cannot doubt but that the feebleness of the pulse is no sign of the absence of plethora, and are accordingly warranted in the withdrawal of blood. In some inflammations again, such as those which attack the abdominal organs,

peritonitis, enteritis, etc., the pulse, though hard and very rapid, is often excessively small; but this must not be any bar to the free use of the lancet, where these diseases are known to be present, since the employment of the remedy will be accompanied by an increase in the fulness and, at the same time, by a diminution of the rapidity of the pulse, even while the blood is flowing. In *asthenic plethora*, however, we cannot hope for so rapid an improvement of the pulse under its use; only small blood-lettings can be borne at first, and must be alternated repeatedly with tonic medicines; but, as the cure advances, larger and larger quantities may be drawn, while the strength of the individual at the same time improves. This whole subject has been most ably elucidated by Dr. Barlow, in his articles on Plethora, Rheumatism, and Gout, in the *Cyclopædia of Practical Medicine*, to which we would refer the student for fuller information on this important point.

Without entering into further detail upon the special diseases for the treatment of which blood-letting is required, a proceeding which would far exceed our present limits, we would now advert to some of those guides by which we may *determine the quantity to be abstracted* in an individual case. In addition to those formerly noticed, namely, the fulness and strength of the pulse, strong action of the heart, and the nature of the organ labouring under inflammation, Dr. Marshall Hall has noticed, among his directions upon this head, the *manner in which the blood flows* from an opened vein, its *colour*, and the *alteration of each* during the operation. Should the blood flow freely, and more so the greater the quantity abstracted, and should its colour present a proper degree of venous hue, or, if previously livid, become less so during its withdrawal, the blood-letting is properly performed, and may be proceeded with to advantage: but should the opposite conditions obtain, the blood flowing tardily, its colour being unusually livid, and not improving in either of these respects as it flows, we are warned of the necessity of caution in the continuance of the measure. But the grand rule which he lays down to guide the practitioner in the abstraction of blood, is the effect which it has in inducing syncope, where practised in an erect position; "so that to *bleed to incipient syncope*, is to bleed precisely according to the exigencies of the case." "In any case, if we place the patient upright and bleed to incipient syncope, we

abstract precisely the quantity of blood which the patient will bear to lose and which the disease requires to be withdrawn." He even goes so far as to apply this law to difficulties in diagnosis, stating that where we find "symptoms resembling arachnitis, pleuritis, and peritonitis, without inflammation," which are "apt to arise from a loaded and deranged state of the stomach and bowels," "we may safely place the patient erect, and bleed to incipient syncope." "We are thus furnished at once with the due measure of the remedy, and the *diagnosis* of the disease." (*Cycl. of Prac. Med.* Art. *Blood-letting.*) We should hesitate, however, before applying so powerful an engine for good or for harm to the *diagnosis* of disease.

Another important consideration in regulating the extent to which we may carry blood-letting, is the *epidemic and endemic constitution.* It has been found that the course which *continued fever* runs at present is very different from that which it used to pass through five-and-twenty years ago. It then exhibited a highly sthenic type, and was accompanied by symptoms of great general excitement. Epidemics of fever then allowed a free use of the lancet, and cases recovered, often with critical discharges, under its employment; the blood presenting, when drawn from a vein, a highly florid appearance, and becoming covered with a buffy coat. But now things are entirely reversed; solitary cases of this kind are very rarely met with by persons in extensive practice, and epidemics of fever are of a typhoid character, accompanied by deep depression of the system, and running a malignant course: patients often sinking under the use of blood-letting, and demanding, on the contrary, the free administration of the most powerful stimulants. This alteration, however, so fully illustrated by continued fever, is not confined to it; on the contrary, it pervades the whole range of disorders which come under the care both of physicians and surgeons; and it is this which is known as the epidemic constitution. *Inflammatory diseases* manifest a disposition to the typhoid form after a longer or shorter duration, and blood-letting can neither be tolerated to the extent formerly practised, nor will patients bear its so frequent repetition. Many of these diseases, like pneumonia, peritonitis, and inflammations of the brain, may present this typhoid condition from the first; and, though we would be far from affirming

that blood-letting is never justifiable in typhus and typhoid inflammations, we would warn the student from a routine adherence to so powerful an antiphlogistic, where this disposition to asthenia is observed.

We cannot so strictly limit the term *endemic constitution*, meaning by it, in this place especially, that difference which practical men observe between persons resident in the country, and those whose occupations confine them to the atmosphere of large and crowded towns. The vigorous constitutions of the former dispose them to more inflammatory forms of disease than those which attack the latter; and the diathesis thus unveiled is not less plainly recognised in the difference which each manifests with regard to the remedy under our notice. The depressing influence of a city life is not confined to the wretched and laborious poor, although want, uncleanliness, close habitations, insufficient protection from the weather, and unhealthy employments in contaminated atmospheres, must extensively aid in debilitating the frame; but it is met with where misery can gain no admission, where affluence affords every means of resisting its weakening tendency, and where sensual indulgence is never permitted to establish its tyrannical sway. In London we meet with abundant examples illustrative of this position; and not only may we apply to almost all diseases the observation which Dr. Willan makes in regard to pulmonary inflammations, that "it is remarkable how few cases of this kind in London admit of repeated bleeding from the arm," but extend it still further, and observe, how few admit of its performance at all. Even the adjoining suburbs of London do not agree in this respect; and we have been surprised at the large quantities of blood which we have drawn in acute diseases at Islington, and at the very rare occasions we have had to employ the lancet in the very same diseases met with at the Dispensary to which we are now attached, the patients of which are of the same class, but reside mostly in the low and densely populated neighbourhood of Somers Town.

Modes of Performing General Blood-letting.—Unless in the case of infants, for whom the application of leeches to the hand or foot often effects a sufficient general depletion, or where they are applied upon a very debilitated subject, or in very extreme

numbers, the practitioner obtains the result he desires by opening an artery or a vein with the lancet. When the former is used, the operation is known as *arteriotomy*, and when the latter, *phlebotomy* or *venesection*. Arteriotomy is limited in its application, being practised only upon the temporal artery, and in diseases affecting the organs within the head. The anterior branch of the artery is preferred, as it passes above the outer angle of the eyebrow. It should be cut transversely, not longitudinally; a lancet being employed as in venesection, and the division of the vessel should be only partial. When as much blood has been drawn as is deemed expedient, the incision should be deepened, so as entirely to divide the artery: on its ends retracting, hæmorrhage will mostly cease; and then, in order to avoid the formation of a false aneurism, it is usual to employ a graduated compress, confined by a bandage round the head. This latter proceeding, however, renders the operation less advisable than perhaps it would otherwise be in inflammations of the brain, although, even if it could be dispensed with, we doubt whether arteriotomy has the same efficacy in depleting the organs within the skull as drawing blood from the jugular vein.

There are two principal situations in which venesection is performed, namely, the bend of the arm, and the neck; but sometimes the surgeon opens the veins of the scrotum for inflammation of the testicle, or of the leg, when it is supposed that some derivant influence may be thereby exerted upon disease within the head. At the bend of the elbow, which is the part most frequently chosen, any of the large superficial veins which appear prominent on grasping the arm may be opened, but the median-cephalic is generally selected. The mode of performing the operation does not require description here; and we would only remark that, unless the object be to abstract the largest possible amount of blood which can be safely drawn without inducing syncope (as in *plethora*), it should be allowed to flow in a full stream, from a moderately large orifice, and without trickling down the arm. We thus obtain it in a proper condition for observing the rapidity of its coagulation, and the abnormal states of the clot. The kind of vessel, moreover, into which it is received, is not unimportant, so far as the formation of a buffy coat is concerned; a small cup, which exposes but a small surface to the air, favouring its appear-

ance, while it may not occur at all, or very slightly, when permitted to coagulate in the ordinary bleeding basin. The cupping also is thus rendered more evident. When bleeding from the external jugular vein, the vessel is made to swell by pressing the thumb upon it just above the clavicle, and it is opened in the usual manner with the lancet, directing the incision upwards and outwards. It is generally performed midway between the clavicle and the jaw; and when a sufficient quantity of blood has flowed, the edges of the wound are closed with a strip of plaster, and a slight bandage and compress. This mode of blood-letting is preferred in inflammatory or other hyperæmic conditions of organs within the head, and also in children, in consequence of the facility with which the vein is found, compared with those at the bend of the arm.

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